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DEPARTMENT OF PUBLIC WORKS

YEAR ENDING NOVEMBER 30

1922

UNIVERSITY OF
MASSACHUSETTS

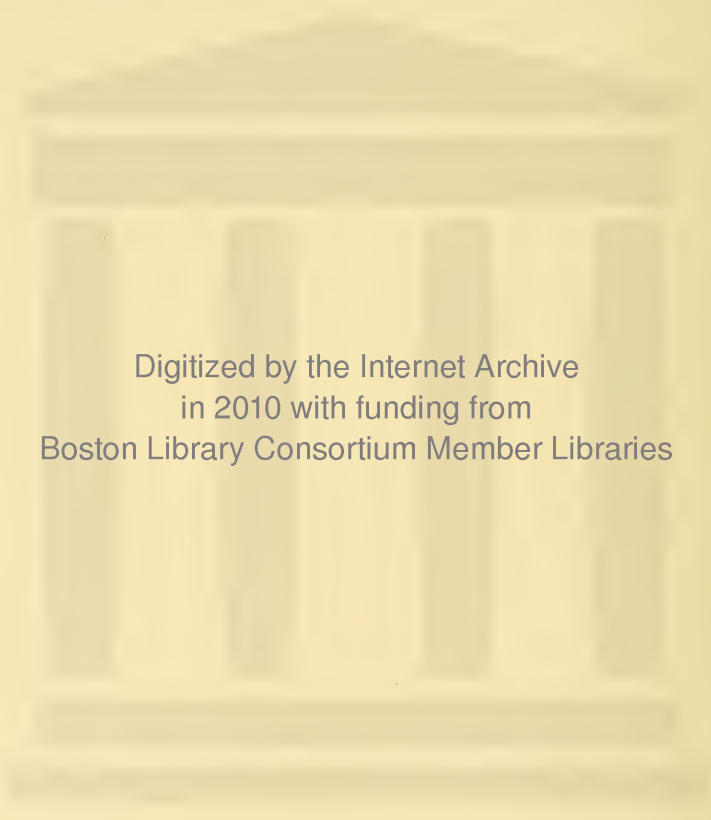
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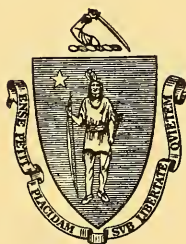
ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

FOR THE

YEAR ENDING NOVEMBER 30, 1922



PUBLICATION OF THIS DOCUMENT

APPROVED BY THE

COMMISSION ON ADMINISTRATION AND FINANCE

BOSTON

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The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC WORKS.

To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts.

Pursuant to the provisions of law the third annual report of the Department of Public Works for the fiscal year ending Nov. 30, 1922, is submitted.

The organization of the Department in two divisions is set forth in chapter 16¹ of the General Laws. Section 6 of said chapter was amended by section 2 of chapter 534 of the Acts of 1922, as follows:—

Except as otherwise provided by sections thirty-one and fifty-eight of chapter ninety and section sixty of chapter one hundred and forty, all rules and regulations within the jurisdiction of the division of highways or the division of waterways and public lands shall be drafted by the associate commissioners having charge of said division, shall be submitted to the commissioner and associate commissioners sitting as a board, and shall take effect when approved by them, and at such time as they shall designate. Said board shall also have power to make all needful rules and regulations for carrying out the provisions of law relating to the department.

The personnel during the year ending Nov. 30, 1922, was as follows:—

Commissioner of Public Works, JOHN N. COLE.²

Division of Highways.

Associate Commissioner, FRANK D. KEMP.³

Associate Commissioner, JAMES W. SYNAN.

Associate Commissioner, FRANK E. LYMAN.⁴

Division of Waterways and Public Lands.

Associate Commissioner, JESSE B. BAXTER.

Associate Commissioner, RICHARD K. HALE.

Executive Secretary for the Department, FREDERICK N. WALES.

¹ Printed in the report for 1921, page 3.

² Died Oct. 18, 1922.

³ Resigned June 14, 1922.

⁴ Appointed June 14, 1922.

Division of Highways.

Chief Engineer, ARTHUR W. DEAN.

Construction Engineer, FRANKLIN C. PILLSBURY.

District Engineers:—

District No. 1, Berkshire County, GEORGE A. CURTIS.

District No. 2,¹ Franklin, Hampshire and Hampden counties, H. D. PHILLIPS.

District No. 3,² Hampden and Worcester counties, JOHN A. JOHNSTON.

District No. 4, Middlesex County, F. D. SABIN.

District No. 5, Essex and Suffolk counties, D. H. DICKINSON.

District No. 6, Norfolk and Bristol counties, R. W. COBURN.

District No. 7, Plymouth, Barnstable, Dukes and Nantucket counties, GEORGE H. DELANO.

Recording Secretary for the Division, MARY A. RILEY.

Financial Secretary for the Division, FRED FAIR.

Division of Waterways and Public Lands.

Chief Engineer, FRANK W. HODGDON.

Assistant to the Chief Engineer, for Boston Harbor, JOHN N. FERGUSON.

Assistant to the Chief Engineer, for harbors and waterways outside Boston Harbor, FRANCIS L. SELLEW.

Recording Secretary for the Division, EDNA F. TOWNSEND.

Financial Secretary for the Division, CORA I. ALLEN.

Bridge Engineer for the Department, WILLIAM F. WILLIAMS.

Registry of Motor Vehicles.

Registrar, FRANK A. GOODWIN.

Chief Clerk, CHARLES R. GILLEY.

Chief of Inspection Force, ALBERT S. OLSSON.

A detailed report is presented herewith, covering the activities for the year of the Division of Highways, the Division of Waterways and Public Lands, and the Registry of Motor Vehicles.

FREDERICK N. WALES,

Acting Commissioner of Public Works.

DEC. 1, 1922.

¹ With the exception of five towns, which are included in District No. 3.

² Including Brimfield, Holland, Monson, Palmer and Wales, those remaining being in District No. 2.

DIVISION OF HIGHWAYS.

APPROPRIATIONS.

Chapter 129, Acts of 1922, making appropriations for the maintenance of departments, boards, commissions, institutions and certain activities of the Commonwealth, etc., is, in part, as follows:—

Service of the Department of Public Works.

Item		
623	For the salaries of the commissioner and the four associate commissioners, a sum not exceeding thirty-one thousand five hundred dollars	\$31,500 00
624	For personal services of clerks and assistants to the commissioner, a sum not exceeding twelve thousand six hundred dollars	12,600 00
625	For traveling expenses of the commissioner, a sum not exceeding fifteen hundred dollars	1,500 00
	Total	<u>\$45,600 00</u>

Division of Highways (the following appropriations for the operation and maintenance of this division, except as otherwise provided, are made from the receipts in the Motor Vehicle Fees Fund):

626	For the personal services of the chief engineer, engineers and office assistants, including certain clerks and stenographers, a sum not exceeding fifty-four thousand five hundred dollars	\$54,500 00
627	For traveling expenses of the associate commissioners, when traveling in the discharge of their official duties, a sum not exceeding twenty-five hundred dollars	2,500 00
628	For services other than personal, including printing the annual report and necessary office supplies and equipment, a sum not exceeding thirteen thousand five hundred dollars	13,500 00
629	For the care, repair and storage, replacement and purchase of road-building machinery and tools, a sum not exceeding three hundred fifty thousand dollars	350,000 00
630	For the suppression of gypsy and brown tail moths on state highways, a sum not exceeding fifteen thousand dollars	15,000 00
631	For the construction and repair of town and county ways, a sum not exceeding six hundred seventy-five thousand dollars	675,000 00
632	For aiding towns in the repair and improvement of public ways, a sum not exceeding five hundred twenty-five thousand dollars	525,000 00
633	For the maintenance and repair of state highways, a sum not exceeding two million two hundred thousand dollars, of which sum three hundred seventy-two thousand three hundred forty-nine dollars and thirty-seven cents represents the receipts from assessments upon certain cities and towns for the maintenance of state highways, and the balance from receipts in the Motor Vehicle Fees Fund	2,200,000 00

Item

634	For the maintenance and operation of the Newburyport bridge and the Brightman street bridge in Fall River, in accordance with the provisions of existing laws, a sum not exceeding twenty thousand dollars	\$20,000 00
	Total	\$3,855,500 00

Registration of Motor Vehicles:

635	For personal services, a sum not exceeding three hundred forty-five thousand dollars, from receipts in the Motor Vehicle Fees Fund	\$345,000 00
636	For services other than personal, including traveling expenses, purchase of necessary supplies, equipment and materials, including cartage and storage of the same, and for work incidental to the registration and licensing of owners of motor vehicles, a sum not exceeding three hundred nine thousand dollars from receipts in the Motor Vehicle Fees Fund	309,000 00
	Total	\$654,000 00

State Highways:

637	For the purpose of enabling the department of public works to secure federal aid for the construction of highways, a sum not exceeding one million eight hundred thousand dollars in addition to any other funds which the department has available for the purpose. Of the said sum one million five hundred thousand dollars shall be payable from receipts in the Motor Vehicle Fees Fund, and the balance from receipts from counties for assessments on highways previously constructed, or from the general fund	\$1,800,000 00
638	For the care of snow on highways, as provided by section eleven of chapter eighty-four of the General Laws, a sum not exceeding fifty thousand dollars, from receipts in the Motor Vehicle Fees Fund	50,000 00

Advertising signs:

639	For administering the law relative to advertising signs near highways, a sum not exceeding fifteen thousand dollars, to be paid from the general fund	15,000 00
	Total	\$1,865,000 00

Special Improvement:

640	For completing the construction of certain highways in the five western counties, as authorized by and subject to the conditions of chapter five hundred and seventy-two of the acts of nineteen hundred and twenty, a sum not exceeding six hundred thousand dollars, the same to be in addition to any sum heretofore appropriated for the purpose	\$600,000 00
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Division of Waterways and Public Lands:

641	For personal services of the chief engineer and assistants, a sum not exceeding fifty-two thousand dollars	52,000 00
642	For necessary traveling expenses of the associate commissioners, a sum not exceeding one thousand dollars	1,000 00
643	For services other than personal, including printing and binding the annual report, and for necessary office and engineering supplies and equipment, a sum not exceeding six thousand dollars	6,000 00

Item

644	For the care and maintenance of the province lands, a sum not exceeding five thousand dollars	\$5,000 00
645	For the maintenance of structures, and for repairing damages along the coast line or river banks of the commonwealth, and for the removal of wrecks and other obstructions from tide-waters and great ponds, a sum not exceeding twenty-five thousand dollars	25,000 00
646	For the improvement, development and protection of rivers and harbors, tidewaters and foreshores within the commonwealth as provided by chapter two hundred and thirty-one of the General Acts of nineteen hundred and nineteen, and of great ponds, a sum not exceeding two hundred fifty thousand dollars	250,000 00
647	For re-establishing and permanently marking certain triangular points and sections, as required by order of the land court in accordance with section thirty-three of chapter ninety-one of the General Laws, a sum not exceeding one thousand dollars	1,000 00
648	For the supervision and operation of commonwealth pier five, including the salaries or other compensation of employees, and for the repair and replacement of equipment and other property, a sum not exceeding eighty-eight thousand dollars	88,000 00
649	For the maintenance of pier one, at East Boston, a sum not exceeding eleven thousand dollars	11,000 00
650	For the maintenance and improvement of commonwealth property under the control of the division, a sum not exceeding fifty thousand dollars	50,000 00
651	For the operation and maintenance of the New Bedford state pier, a sum not exceeding six thousand dollars	6,000 00
652	For the compensation of dumping inspectors, a sum not exceeding three thousand dollars, to be paid from the Waterways Fund	3,000 00
653	For the inspection of state monuments, a sum not exceeding nine hundred twenty-one dollars and thirty-eight cents	921 38
654	For continuing the work in gauging the flow of water in the streams of the commonwealth, a sum not exceeding three thousand dollars	3,000 00
	Total	<u>\$501,921 38</u>
655	For expenses on account of the dry dock arbitration board, a sum not exceeding twenty-two hundred and fifty dollars, to be paid from the port of Boston receipts	\$2,250 00
656	For expenses of dredging channels and filling marsh lands, a sum not exceeding three hundred thousand dollars, to be paid from the port of Boston receipts or ordinary revenue	300,000 00
657	For the extension of the East Boston bulkhead, a sum not exceeding one hundred thousand dollars, to be paid from the port of Boston receipts	100,000 00
658	For dredging minor channels in Boston harbor, a sum not exceeding fifty thousand dollars, to be paid from the port of Boston receipts	50,000 00
659	For making rail connections in East Boston, a sum not exceeding eighty thousand dollars, the same to be in addition to any amount heretofore appropriated for the purpose and to be paid from the port of Boston receipts	80,000 00
	Total	<u>\$532,250 00</u>

DEFICIENCIES.

For deficiencies in certain appropriations of previous years, in certain items, as follows:

Department of Public Works.

Division of Waterways and Public Lands:

For the supervision and operation of commonwealth pier five, the sum of one hundred sixty-two dollars and twenty cents .	\$162 20
For railroad track connections and certain roadways at South Boston, the sum of one hundred thirty-one thousand dollars	131,000 00
For certain improvements at Hayward's creek, the sum of thirty thousand five hundred ninety-six dollars and twenty-two cents	30,596 22

Chapter 546, Acts of 1922, in addition to the general appropriation act making appropriations to supplement certain items contained therein, and for certain new activities and projects is, in part, as follows: —

Item

148½ For certain improvements at the Massachusetts Soldiers' Home, as authorized by chapter twenty-eight of the resolves of the present year, a sum not exceeding fifteen thousand dollars .	\$15,000 00
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Claims.

Payments for certain claims authorized by the following appropriations shall be certified by the auditor of the commonwealth only upon the filing of satisfactory releases or other evidence that the payments are accepted in full compensation on the part of the commonwealth in respect thereto:

235½ For Albert B. Leighton of Westborough, for injuries sustained on November twentieth, nineteen hundred and twenty-one, by being struck by an automobile truck operated by an employee of the department of public works of the commonwealth, the sum of three hundred dollars	\$300 00
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Service of the Department of Public Works.

Registration of Motor Vehicles:

635 For personal services, a sum not exceeding two thousand dollars, from receipts in the Motor Vehicle Fees Fund, same to be in addition to any amount heretofore appropriated for the purpose	\$2,000 00
636 For services other than personal, including traveling expenses, purchase of necessary supplies, equipment and materials, including cartage and storage of the same and for work incidental to the registration and licensing of owners of motor vehicles, a sum not exceeding two thousand dollars, from receipts in the Motor Vehicle Fees Fund, same to be in addition to any amount heretofore appropriated for the purpose	2,000 00

Item

Division of Waterways and Public Lands:

648	For the supervision and operation of commonwealth pier five, including the salaries or other compensation of employees, and for the repair and replacement of equipment and other property, a sum not exceeding fifteen thousand five hundred dollars, the same to be in addition to any amount heretofore appropriated for the purpose	\$15,500 00
656	For expenses of dredging channels and filling marsh lands, a sum not exceeding thirty-five thousand dollars, as authorized by chapter four hundred and four of the acts of the present year, to be paid from the port of Boston receipts or ordinary revenue, the same to be in addition to any amount heretofore appropriated for the purpose	35,000 00
	Total	\$54,500 00

DEFICIENCIES.

For deficiencies in certain appropriations of previous years, in certain items, as follows:

Department of Public Works.

Division of Highways:

For the maintenance and repair of state highways, the sum of two hundred seventy-eight dollars and eighty-nine cents	\$278 89
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EXPENDITURES.

Summary of expenditures by the Division during the fiscal year ending Nov. 30, 1922:—

For construction of State highways, under chapter 81 of the General Laws	\$2,883,592 54
For maintenance of State highways, under section 13, chapter 81 of the General Laws	1,963,097 86
For construction and repair of town and county ways, under section 34, chapter 90 of the General Laws as amended	738,809 44
For construction and repair of ways in certain towns, under section 23, chapter 81 of the General Laws	13,731 59
For highways in the five western counties, under chapter 221, General Acts of 1915	246,253 20
For aiding towns in the repair and improvement of public ways, under section 26, chapter 81 of the General Laws as amended	501,538 97
For the construction of a State highway in Hingham, under chapter 213, General Acts of 1916, and chapter 138, Acts of 1921	80,166 27
For the construction of a highway in Chester, Middlefield, Peru and Hinsdale, under chapter 566, Acts of 1920	42,641 87
For the construction of a highway in Blandford, Otis, Monterey and Great Barrington, under chapter 571, Acts of 1920	7,900 53

For the construction and improvement of a highway in the town of Holden, under chapter 521, Acts of 1920	\$20,307 81
For the construction and improvement of a highway in the towns of Hubbardston and Rutland, under chapter 337, General Acts of 1919	352 90
For the construction of a highway in the city of Chelsea, under chapter 28, Resolves of 1922	13 39
For the care of snow on highways, under chapter 129, Acts of 1922, item 638	43,420 15
For administering the law relative to advertising signs near highways, under chapter 129, Acts of 1922, item 639	11,272 62
For the maintenance and operation of the bridge over Merrimack River between Newburyport and Salisbury, under chapter 716, Acts of 1912, and chapter 129, Acts of 1922, item 634	8,465 94
For the maintenance and operation of the bridge over Taunton Great River at Brightman Street in Fall River, under chapter 717, Acts of 1912, and chapter 129, Acts of 1922, item 634	13,988 90
For the care, repair and storage, replacement and purchase of road building machinery and tools, under chapter 129, Acts of 1922, item 629	349,731 16
For the suppression of gypsy and brown-tail moths on State highways, under chapter 129, Acts of 1922, item 630	14,622 99
For general expenses under chapter 129, Acts of 1922, items 626, 627, 628	68,963 48
Total	\$7,008,871 61

CO-OPERATIVE WORK — SUPERVISION OF EXPENDITURES.

The Division has supervised the expenditures during the year by cities, towns and counties, under section 26 of chapter 81 of the General Laws, as amended by section 1 of chapter 120 of the Acts of 1921 and chapter 281¹ of the Acts of 1922, and under section 34 of chapter 90 of the General Laws, as amended by section 1 of chapter 112 of the Acts of 1921, of approximately \$1,294,126.45 for co-operative work, in repairing, maintaining and improving certain public ways, and for other road work for which the towns and cities made contributions. All such work was carried out in conformity with contracts, specifications and plans approved by the Division.

¹ See pages 57, 58 of this report.

PETITIONS, MEETINGS AND HEARINGS.

In addition to the regular weekly meetings of the Division throughout the year, numerous hearings and conferences have been held, including the annual meeting and hearing in the several counties in the Commonwealth, for the open discussion of questions relative to the public ways, as required by section 1 of chapter 81 of the General Laws; hearings on petitions for the relocation of street railway tracks in Methuen, Dracut, Boston, Andover, Haverhill and Merrimac; appeals from the action taken by the registrar of motor vehicles in the suspension or revocation of certain licenses to operate motor vehicles; and on the matter of outdoor advertising.

Petitions were received and contracts signed during the year, as follows:—

	Petitions.	Contracts.
State highways	8	24
Work under section 34, chapter 90, General Laws, as amended	73	126
Work under section 26, chapter 81, General Laws, as amended	130	163
Work under section 23, chapter 81, General Laws	—	1
Work under special acts	—	6
Totals	211	320

GENERAL STATEMENT AS TO SURVEYS, PLANS, ESTIMATES AND OTHER WORK DURING THE YEAR.

State Highways.—During the year ending Nov. 30, 1922, the Division completed work on about 35.7 miles of State highway, portions of which were laid out in 1921. Construction was commenced, but not completed, on over 7 miles of road in 7 cities and towns. Layouts were made of 53.128 miles of State highway in 29 cities and towns. Under chapter 81 of the General Laws, as amended by chapter 427, Acts of 1921, 6.555 miles of State highway were discontinued. The total length of State highways at the end of the year was 1,440.121 miles.

Surveys, Estimates and Designs.—During the year preliminary surveys, plans and estimates were made on contemplated State highways in 23 towns covering a distance of

63 miles. Surveys, plans and estimates were made for resurfacing or reconstruction in 32 towns covering a distance of 49.02 miles. Lines and grades for construction work on State highways were made in 13 towns covering a distance of 49.82 miles, and for resurfacing and reconstruction in 13 towns for a distance of 16.24 miles. Final surveys were made on completed State highways in 22 towns for a distance of 47.42 miles, for resurfacing or reconstruction in 8 towns for a distance of 16.40 miles, and on roads other than State highways in 27 towns for a distance of 28.85 miles. Under section 23 of chapter 81 of the General Laws and section 34 of chapter 90 of the General Laws, as amended, and for roads to be constructed by the towns, surveys, plans and estimates have been made in 98 towns for a distance of 88.93 miles.

Lines and grades for construction have been made in 92 towns for a distance of 71.40 miles.

Under chapter 221, General Acts of 1915, and for work under special acts, surveys, plans and estimates have been made in 20 towns for a distance of 43.88 miles, and lines and grades for construction have been made in 8 towns for a distance of 13 miles.

Layout plans have been made in 29 towns, covering a distance of 53.128 miles.

Plans to accompany decrees for street railway locations on State highways have been made in 2 towns.

Roads constructed in 1922. — Construction has been completed on 35.70 miles of State highway, 7.05 miles of highways under the provisions of section 23 of chapter 81 of the General Laws, 90.79 miles of highways under the provisions of section 34 of chapter 90 of the General Laws, as amended, and 9.46 miles of highways under the provisions of special acts, making a total of 143 miles completed during the year.

Of the above roads completed this year, .87 of a mile was of water-bound macadam; 28.40 miles were of gravel; 6.71 miles were of bituminous concrete; 77.93 miles were of bituminous macadam; 2.28 miles were of water-bound macadam with an oil or tar surface applied; 15.46 miles were of reinforced concrete; 7.01 miles were of gravel with an oil surface applied, and 2.34 miles were earth roads, that is, surfaced with the best available material.

Resurfacing and Widening. — During the year 1.67 miles of State highway were widened but not resurfaced, and 10.65 miles were resurfaced and widened. These figures are for completed work. There is uncompleted work in various stages on a number of miles of road where the work will be completed next year.

Permits. — There were 1,391 permits issued during the year for opening or occupying State highways for various purposes.

Trees on State Highways. — During the last eighteen years 46,048 trees have been planted on the borders of State highways, of which 441 were planted this year, the Division continuing its policy of planting quick-growing trees and hedges to replace guard rails.

Engineering Advice to Municipal Authorities. — The Division furnished, without charge, engineering advice to 24 cities and towns in accordance with the provisions of section 1 of chapter 81 of the General Laws.

FIVE-YEAR PROGRAM FOR HIGHWAY WORK.

In addition to the constantly increasing demand for better roads and more of them, the Division is confronted with a maintenance problem which is growing to such an extent that it is believed a radical change in policy or practice should be adopted to accomplish an increased rate of reconstruction to new construction during the next few years.

Of the 1,440 miles of State highway now under maintenance, nearly one-half was built more than ten years ago, and some have been built over twenty years. There are at present 586 miles of State highway which are surfaced with waterbound macadam, gravel, dirt or a sand-clay mixture. In addition to the above, there are at least 100 miles of State highway that are inadequate for modern traffic.

These old roads are under a constantly increasing cost for maintenance, and they should be reconstructed as soon as possible, not only to meet modern requirements, but also to terminate this excessive annual cost which adds nothing of permanence to the road and must be repeated year after year at a constantly increasing rate.

It must not be assumed, however, that the reconstruction of

all of these old roads will entirely eliminate the annual expenditures for maintenance of State highways, as there will always be the necessary repairs due to wearing out of surfaces, and there will be the expense of maintaining the roadsides, including shoulders, ditches, slopes, shade trees and the upkeep and care of the drainage.

Furthermore, it cannot be too forcibly expressed that surfaces and foundations of all State highways should be sufficiently strong to carry reasonable loads at all seasons of the year, and motor vehicle users, who now pay nearly all of the State road expenses, are justified in expecting and demanding that this condition should be brought about.

It is not the opinion of the Division that expansion of the State highway system and the construction of new roads in co-operation with counties and towns should cease or even be curtailed, but unless additional funds are provided, the construction of new roads should be restricted until the reconstruction of the old surfaces can be accomplished.

Under the so-called Federal Aid Acts the Commonwealth will of necessity continue with the construction of over 100 miles of road in order to effect the completion of the required "7 per cent" system. In addition to the requirements of the Federal Aid system there are several miles of new roads that should be built in order to complete certain gaps on important main routes.

Co-operation by the State with counties and towns (General Laws, chapter 90) in the improvement of town ways is of extreme importance, as evidenced by the results accomplished in the last few years. Any program for future work should give full and adequate consideration to this phase of the work of the Division, and the allotments by the Division for this class of work should be increased to meet the demands and necessities of the counties and towns. Attention is called to the fact that every dollar expended by the State on co-operative work means that one or more dollars are expended by the counties and towns upon roads that are important feeders to the highway system, and hence may be considered as an integral part of the same.

Co-operation by the State with towns having a valuation under \$3,000,000 (chapter 81, General Laws) has also proved

an important work of the Division, and the number of towns taking advantage of this provision of the law is increasing to such an extent that it is anticipated that nearly all eligible towns will request assistance during the coming year. By preparing what might be called a "maintenance budget" in towns in which work is done under this law, and by increasing the competency of local men engaged in this work, the money will be economically expended where it is most needed. The improved condition of the ways in these towns will, in a few years, furnish conclusive proof that this State co-operation is advisable, and that the legislation and appropriations are more than justified.

It is also believed and strongly urged by the Division that much more attention should be given to the reconstruction of bridges under a co-operative plan that will assist the towns in carrying the heavy financial burdens imposed by this situation. At present, the most pronounced of the weak links in the chain of good roads in the State are the many minor bridges on the main and secondary roads that are not adequate to carry modern loads. It should also be stated at this time that while many of these bridges are on State highways they were not taken over by the State and are still maintained by the towns. An examination of some of these bridges shows that they are theoretically insufficient in strength to withstand a load of more than 6 tons, and while only a few have actually broken down, it is almost miraculous that there have not been many more failures. In many localities the drivers of motor vehicles carrying legally limited loads on important roads are obliged to drive over roundabout routes in order to avoid unsafe bridges.

The reconstruction of all of the minor bridges in the State that are inadequate in strength or width involves a very large expenditure of money. Therefore a definite and comprehensive program for strengthening or rebuilding these bridges should be adopted and the work commenced at once. Many towns are financially unable to carry on this reconstruction to meet the present requirements of traffic, hence the State might consistently aid the towns on these minor bridges, leaving the construction of major bridges to the counties and municipalities, as in the past.

The Division does not consider that the funds derived from

motor vehicle fees and licenses are anywhere near sufficient to carry on the work of the Division as herein outlined, and it therefore believes that additional funds should be raised by whatever method the Legislature may determine.

Realizing fully the highway necessities of the State, and believing that the problem should be broadly considered so as to cover a period of years, the Division has mapped out a tentative five-year program which provides not only for the reconstruction of a very large portion of the old State highways, but also for additions to this system where necessity demands, including also the co-operative work with counties and towns as in the past, together with provision for co-operation in the strengthening and rebuilding of minor bridges.

Previous to 1919 appropriations for State highway construction were made on a five-year basis, designating the amount that would become available during each of the five years following the year in which the appropriation was made. The appropriations for State highway reconstruction, however, have been made annually, thereby causing serious handicap to an orderly and systematic expenditure of funds. Under the present system, appropriations are made about the first of April, leaving only eight months in each year for the expenditure of large sums of money. This is not an economical way of doing business, and often leads to such haste that projects are not as thoroughly studied as they should be, and expensive work is sometimes done which could have been avoided had there been more time for the preliminary study of the projects before contracts were awarded.

It has been very clearly seen that if contracts could be prepared, and either let in the late months of the year or in the early spring of the following year, contractors would be enabled to so arrange their plans and organization that the work could be done by them at a considerable saving in time and cost, which will revert to the benefit of the State. At the present time the Division has on file all the data necessary for contracting several projects, but under existing laws they cannot be let for construction until the appropriations for 1923 are made. Under these conditions it is necessary to place a short-time limit on the prosecution of the work, which should result in higher prices on the very natural assumption that proposals

would only be received from those contractors who have the equipment and organization to complete the work within the time fixed by the contract. But, as a matter of fact, it too often results in a low bidder who is not well informed or properly equipped to carry out the terms of the contract, and the work is not only seriously delayed, but the contractor suffers a heavy financial loss. It might be said that the remedy for this situation is to not award the contract to the lowest bidder, but the adoption of such a policy would destroy the present system of competitive bidding, which, notwithstanding its defects, is the only safe and impartial method for the Division to adopt in awarding the many contracts required to carry on its work.

The table which follows is an estimate of the annual receipts and disbursements, based largely upon an assumed registration of motor vehicles which, if correct, will enable the Division to carry out a five-year program that will accomplish the results outlined in this report. It is assumed, as shown by the first column, that the registration of motor cars will continue to increase in the ratio established during the last two years, for the next five or six years, and the estimated net receipts from motor vehicles is based upon this assumption.

The receipts from the Federal Aid are quite definitely fixed by the terms of the law and will not vary much from the figures given.

The assessments from counties for construction, and from cities and towns for maintenance of State highways, are assumed at a fixed figure each year on the basis of a uniform plan of new construction and maintenance.

The amount estimated to meet the additional funds required to finance the program is based upon the registration of motor vehicles and is equivalent to \$4.50 per car.

The estimated disbursements for bridge construction are arbitrarily fixed at an ascending rate that it is assumed will provide for the most urgent cases during the next five years.

The estimated cost of county and town roads under chapters 90 and 81, together with the maintenance of State highways, is then provided for, and the balance becomes available for the reconstruction and new construction of State highways as shown in column 9 of the table.

The last column gives the number of miles of new construction and reconstruction of State highways that can be accomplished under this program, and indicates that about 50 miles of old roads can be reconstructed without a reduction in the past average annual construction of new roads.

HIGHWAY PROGRAM.
Estimated Receipts and Disbursements for a Period of Five Years.

YEAR.	1	2	3	4	5	6	7	8	9	10
	Number of Cars registered.	Net Receipts from Registration.	Additional Funds at \$4.50 per registered Car.	Federal Aid available.	Maintenance and Construction Assessments.	Totals of Columns 2, 3, 4 and 5.	Proposed Bridge Construction.	Miscellaneous Expenditures. ¹	Available for Construction and Resurfacing State Highways.	Miles of Road can be built.
1923	538,731	\$6,284,091	\$2,424,290	\$1,541,500	\$1,175,000	\$11,424,881	\$500,000	\$4,486,000	\$6,438,881	129
1924	614,166	7,331,439	2,763,747	1,516,250	1,175,000	12,786,436	1,000,000	4,251,000	7,535,436	151
1925	689,601	8,378,788	3,103,205	1,382,500	1,175,000	14,039,492	1,500,000	4,418,000	8,121,492	162
1926	765,036	9,426,136	3,442,662	1,350,000	1,175,000	15,393,798	2,000,000	4,321,000	9,072,798	182
1927	840,471	10,473,485	3,782,120	1,350,000	1,175,000	16,780,604	2,500,000	4,244,250	10,036,354	201

¹ Include: ordinary maintenance, western counties, care of snow, maintenance of draw bridges, machinery, chapter 90, section 34, chapter 81, section 26, overhead, engineering, trees and moths.

STATE HIGHWAYS.

General Laws, chapter 81, section 4, provides that —

If county commissioners, aldermen or selectmen adjudge that public necessity and convenience require that the commonwealth lay out and take charge of a new or existing way as a highway in whole or in part, in their county, city or town, they may apply, by a written petition, to the division, requesting that said way be laid out and taken charge of by the commonwealth.

Petitions under the aforesaid section have been received during the year, as follows: —

COUNTY COMMISSIONERS OF ESSEX COUNTY. — Road extending from the boundary between the towns of Topsfield and Ipswich, through the towns of Ipswich, Rowley and Newbury to the boundary between the town of Newbury and the city of Newburyport, locally known as the Newburyport Turnpike. Received April 11, 1922.

SELECTMEN OF SOUTHWICK. — Road extending from the boundary between the city of Westfield and the town of Southwick, through Southwick, to the boundary between the town of Southwick and the town of Granby in the State of Connecticut. Received May 23, 1922.

SELECTMEN OF GREAT BARRINGTON. — Section of road in Great Barrington, extending from the boundary between the towns of Egremont and Great Barrington to a point at or near the railroad crossing on Main Street. Received July 26, 1922.

SELECTMEN OF DALTON. — Section of road locally known as Water Street, extending from the existing State highway on Water Street to the boundary between the towns of Dalton and Hinsdale. Received July 26, 1922.

SELECTMEN OF DALTON. — Section of road locally known as North Street, extending from the existing State highway, at its junction with North Street, to the boundary between the towns of Dalton and Windsor. Received July 26, 1922.

SELECTMEN OF WEST BOYLSTON. — Section of road locally known as Lancaster Street, extending from the boundary between the towns of Sterling and West Boylston to the junction of Lancaster and Sterling streets. Received Aug. 29, 1922.

SELECTMEN OF STERLING. — Section of road locally known as Lancaster Street, extending from the boundary between the towns of Clinton and Sterling to the boundary between the towns of Sterling and West Boylston. Received Aug. 29, 1922.

SELECTMEN OF BELLINGHAM. — Road beginning at Crooke's Corner in Bellingham, and extending northerly along South Main Street to Bellingham Center; thence northerly along North Main Street to the Hartford Turnpike. Received Nov. 24, 1922.

CONSTRUCTION AND RESURFACING OF STATE HIGHWAYS.

(Chapter 81, General Laws.)

The following contracts were entered into during the year for the construction and resurfacing of State highways in various municipalities: —

Hingham.

Feb. 7, 1922, contract made with W. H. Connor & Son Company of Middleborough for the construction of a retaining wall and extension of bridges on 150 feet of State highway on Summer Street. The proposal amounted to \$23,365.

Work completed Sept. 13, 1922.

Expenditure during 1922, \$23,077.50.

Falmouth.

March 28, 1922, contract made with Atwood-Thomas Construction Company of Middleborough for the construction of a bridge and approaches on 625 feet of State highway, the surfacing consisting of bituminous macadam 18 feet wide. The proposal amounted to \$8,602.50.

Work completed Sept. 13, 1922.

Expenditure during 1922, \$6,685.99.

Wilbraham-Palmer-Monson.

March 28, 1922, contract made with D'Onfro Brothers, Inc., of Leominster for the construction of about 13,665 feet of State highway on the Boston Post Road, the surface consisting of cement concrete 20 feet wide. The proposal amounted to \$149,535.50.

Work completed Dec. 19, 1922.

Expenditure during 1922, \$141,499.38.

Hingham.

March 29, 1922, contract made with Charles M. Callahan of Boston for the construction of about 3,465 feet of State highway on Otis and Summer streets, the surface consisting of cement

concrete 30 feet wide on 3,050 feet, and bituminous macadam on 415 feet. The proposal amounted to \$42,886.50.

Work completed Sept. 13, 1922.

Expenditure during 1922, \$57,088.77.

Topsfield-Ipswich-Rowley-Newbury.

April 4, 1922, contract made with Coleman Brothers, Inc., of Boston for the construction of 10.557 miles of State highway on the Newburyport Turnpike, the surface, varying from 18 to 24 feet in width, consisting of bituminous macadam on 3.232 miles, and cement concrete on 7.325 miles. The proposal amounted to \$503,830.50.

Work completed Dec. 12, 1922.

Expenditure during 1922, \$464,728.71.

Southwick.

April 11, 1922, contract made with Cenedella & Co. of Milford for the construction of 6.875 miles of State highway on the Westfield-Granby road and 3.258 miles of town road on the Southwick-Granville road, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$301,531.

Work about two-thirds completed.

Expenditure during 1922, \$222,095.80.

Shelburne.

May 2, 1922, contract made with Thomas J. Quinn of Ashton, R. I., for the construction of 4.45 miles of State highway on the Greenfield road, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$219,349.

Work completed Nov. 28, 1922.

Expenditure during 1922, \$199,871.94.

Williamstown-New Ashford.

May 9, 1922, contract made with the Hoyt Construction Company of Holyoke for the construction of 5,350 feet of State highway on the River Road in Williamstown and 12,196

feet of State highway in New Ashford, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$127,604.55.

Work about 90 per cent completed.

Expenditure during 1922, \$110,681.93.

Easton-Raynham.

June 6, 1922, contract made with Carlo Bianchi & Co., Inc., of Framingham for the construction of 18,700 feet of State highway on the turnpike in Easton and 325 feet of State highway in Raynham, the surface, 20 feet in width, consisting of bituminous macadam on 14,900 feet, and cement concrete on 4,125 feet. The proposal amounted to \$180,342.35.

Work about 80 per cent completed.

Expenditure during 1922, \$142,607.47.

Mendon.

June 6, 1922, contract made with the Luigi C. Carchia Company of Boston for the construction of 2.504 miles of State highway on the Hopedale road, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$101,081.

Work about 90 per cent completed.

Expenditure during 1922, \$90,234.29.

Lee.

June 6, 1922, contract made with Charles E. Horne of Millbury for the surfacing of 13,700 feet of State highway on Maple, Housatonic and Water streets, the surface consisting of cement concrete 20 feet wide. The proposal amounted to \$143,139.

Work about 90 per cent completed.

Expenditure during 1922, \$122,457.66.

Dalton-Windsor.

June 6, 1922, contract made with the Lane Construction Corporation of Meriden, Conn., for the construction and reconstruction of 11,048 feet of State highway in Dalton and 7,889 feet of State highway in Windsor, the surface consisting

of bituminous macadam 18 feet wide. The proposal amounted to \$161,958.50.

Work completed Dec. 26, 1922.

Expenditure during 1922, \$139,344.14.

Cummington-Goshen.

June 13, 1922, contract made with Thomas J. Quinn of Ashton, R. I., for the construction of 3,756 feet in Cummington and 16,185 feet in Goshen, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$221,951.60.

Work about 80 per cent completed.

Expenditure during 1922, \$172,246.16.

Haverhill-Merrimac.

June 20, 1922, contract made with the Rowe Contracting Company of Malden for the surfacing of 4,500 feet of State highway in Merrimac and 14,029 feet of State highway in Haverhill, the surface consisting of cement concrete varying from 20 to 24 feet wide. The proposal amounted to \$189,082.25.

Work about 70 per cent completed.

Expenditure during 1922, \$134,106.33.

Windsor-Cummington.

June 20, 1922, contract made with the Hanscom Construction Company of Boston for the construction of five bridges and the approaches thereto on 1.48 miles of State highway, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$119,803.25.

Work about one-half completed.

Expenditure during 1922, \$66,862.75.

North Adams.

July 5, 1922, contract made with the city of North Adams for the construction of 681 feet of State highway on the Hodges Crossing road, the surface consisting of cement concrete 20 feet wide. The estimated cost amounted to \$9,500.

Work about one-fourth completed.

Expenditure during 1922, \$2,533.64.

Dover.

July 11, 1922, contract made with the town of Dover for the reconstruction of 272 feet of State highway at the approach to Day's bridge over the Charles River, the surface consisting of bituminous macadam, varying from 18 to 26 feet in width. The estimated cost amounted to \$1,250.

Expenditure during 1922, \$6.58.

Needham.

July 11, 1922, contract made with the town of Needham for the reconstruction of 190 feet of State highway at the approach to Day's bridge over the Charles River, the surface consisting of bituminous macadam, varying from 18 to 26 feet in width. The estimated cost amounted to \$1,250.

No expenditures made during 1922.

Becket.

July 18, 1922, contract made with the Frissell Engineering Company of Gardner for the construction of three bridges and the approaches thereto on 1,000 feet of State highway, the surface consisting of gravel 18 feet wide. The proposal amounted to \$26,201.75.

Work completed Dec. 26, 1922.

Expenditure during 1922, \$21,532.71.

Great Barrington.

July 18, 1922, contract made with the Lane Construction Corporation of Meriden, Conn., for the construction of 16,037 feet of State highway on Maple Avenue, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$117,417.85.

Work about one-third completed.

Expenditure during 1922, \$45,783.72.

Lowell.

July 18, 1922, contract made with Powers Brothers of Brockton for the construction of 5,158 feet of State highway on First Street, the surface consisting of bituminous macadam 27 feet wide. The proposal amounted to \$103,918.

Work about one-fourth completed.

Expenditure during 1922, \$27,365.64.

Sterling-West Boylston.

July 26, 1922, contract made with the State Contracting Company of Boston for the construction of 7,246 feet of State highway on Lancaster Street in Sterling and 11,188 feet in West Boylston, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$104,268.25.

Work about two-fifths completed.

Expenditure during 1922, \$41,126.41.

Andover.

July 26, 1922, contract made with the M. McDonough Company of Swampscott for the surfacing of 6,385 feet of State highway on Main Street, the surface consisting of cement concrete varying from 24 to 34 feet in width. The proposal amounted to \$90,224.

Expenditure during 1922, \$4,296.61.

Leicester.

Aug. 16, 1922, contract made with Bruno & Petitti of Boston for the surfacing of 14,694 feet of State highway on the Boston road, the surface, 20 feet wide, consisting of bituminous macadam on 486 feet and cement concrete on 14,208 feet. The proposal amounted to \$187,092.25.

Expenditure during 1922, \$18,627.17.

The expenditures during the year in various counties were: —

COUNTY.	Amount.
Barnstable	\$24,126 48
Berkshire	454,228 41
Bristol	162,642 29
Essex	914,752 85
Franklin	327,055 27
Hampden	202,895 98
Hampshire	346,939 75
Middlesex	83,066 50
Suffolk	54,420 18
Worcester	313,464 83

Details of the foregoing expenditures follow: —

Barnstable County.

Wellfleet	\$24,126 48
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Berkshire County.

Becket	24,533 74
Dalton	98,976 72
Egremont	45,326 23
Great Barrington	52,164 63
New Ashford	90,797 57
North Adams	2,886 76
Williamstown	35,310 19
Windsor	104,232 57

Bristol County.

Easton	162,482 78
Taunton	159 51

Essex County.

Danvers	133,285 26
Ipswich	90,014 71
Lynnfield	14,046 54
Middleton	16,105 69
Newbury	217,094 30
Peabody	8,289 44
Rowley	174,734 45
Saugus	1,899 66
Topsfield	259,282 80

Franklin County.

Greenfield	\$33,771 19
Shelburne	293,284 08

Hampden County.

Southwick	202,895 98
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Hampshire County.

Cummington	132,495 16
Goshen	155,039 26
Huntington	39,768 50
Ware	19,636 83

Middlesex County.

Littleton	43,955 89
Lowell	31,179 61
Woburn	7,931 00

Suffolk County.

Boston	54,420 18
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Worcester County.

Athol	838 19
Barre	2,939 70
Leicester	1,222 57
Mendon	117,326 23
Oakham	338 86
Oxford	28,416 26
Petersham	197 99
Sterling	29,052 10
Templeton	10,328 78
Upton	113 65
Uxbridge	448 95
West Boylston	17,806 13
Winchendon	104,435 42
Total	\$2,883,592 54

MAINTENANCE OF STATE HIGHWAYS.

(Section 13, chapter 81, General Laws.)

Section 13 of chapter 81 of the General Laws provides —

State highways shall be maintained and kept in good repair and condition by the division at the expense of the commonwealth. The division shall keep all state highways reasonably clear of brush, shall cause suit-

able shade trees to be planted thereon if practicable, and may establish and maintain watering troughs upon said highways.

The expenditures during the year in various counties were: —

COUNTY.	Amount.
Barnstable	\$76,271 12
Berkshire	333,528 19
Bristol	80,622 95
Dukes	9,231 72
Essex	300,136 81
Franklin	109,796 37
Hampden	265,332 23
Hampshire	69,635 85
Middlesex	191,085 40
Nantucket	2,038 60
Norfolk	99,800 75
Plymouth	99,716 70
Suffolk	10,733 65
Worcester	304,676 22

Details of the foregoing expenditures follow: —

Barnstable County.

Barnstable	\$4,871 86
Bourne	10,617 97
Brewster	2,501 88
Chatham	4,378 38
Dennis	5,840 23
Eastham	751 64
Falmouth	9,012 30
Harwich	6,672 23
Mashpee	1,726 30
Orleans	2,988 83
Provincetown	6,135 58
Sandwich	5,096 69
Truro	5,949 61
Wellfleet	2,466 76
Yarmouth	7,260 86

Berkshire County.

Adams	2,713 83
Becket	12,614 43
Cheshire	10,441 91

Clarksburg	\$5,267 79
Dalton	4,051 68
Egremont	5,801 09
Florida	17,485 80
Great Barrington	7,010 72
Hancock	1,445 85
Hinsdale	4,084 56
Lanesborough	2,534 03
Lee	159,130 00
Lenox	14,385 46
New Ashford	63 95
New Marlborough	166 99
North Adams	37,081 04
Pittsfield	13,342 45
Richmond	5,426 64
Savoy	4,339 50
Sheffield	7,530 13
Stockbridge	3,514 35
Washington	763 07
Williamstown	10,494 99
Windsor	3,837 93

Bristol County.

Acushnet	3,875 98
Attleboro	2,552 34
Berkley	1,369 96
Dartmouth	4,917 78
Dighton	3,052 29
Easton	88 98
Fairhaven	1,467 42
Fall River	111 42
Freetown	1,184 33
Mansfield	1,073 98
North Attleborough	3,899 51
Norton	5,066 12
Raynham	3,211 35
Rehoboth	3,122 17
Seekonk	7,372 69
Somerset	17,811 21
Swansea	8,683 11
Taunton	5,791 05
Westport	5,971 26

Dukes County.

Chilmark	2,617 79
Edgartown	257 79
Gay Head	3,052 74

Oak Bluffs	\$253 06
Tisbury	306 97
West Tisbury	2,743 37

Essex County.

Amesbury	3,619 20
Andover	11,179 08
Beverly	6,588 16
Danvers	1,341 35
Essex	1,447 60
Gloucester	5,456 80
Groveland	3,139 91
Hamilton	1,478 47
Haverhill	113,336 48
Ipswich	8,884 74
Lawrence	1,663 10
Lynn	2,446 25
Lynnfield	1,324 63
Merrimac	61,817 37
Methuen	10,833 93
Middleton	2,417 00
Newbury	8,500 39
Newburyport	2,598 70
North Andover	15,162 05
Peabody	1,484 92
Rockport	1,484 17
Rowley	6,044 39
Salem	1,977 45
Salisbury	11,220 09
Saugus	5,119 70
Swampscott	944 09
Wenham	3,444 56
West Newbury	5,182 23

Franklin County.

Ashfield	1,540 54
Bernardston	31,273 36
Buckland	2,810 70
Charlemont	16,250 91
Colrain	2,152 56
Conway	2,000 12
Deerfield	12,317 90
Erving	10,223 62
Gill	53 80
Greenfield	4,108 03
Montague	4,845 71
Northfield	3,436 47

Orange	\$10,184 18
Shelburne	4,066 85
Sunderland	1,790 42
Whately	2,741 20

Hampden County.

Agawam	3,448 06
Blandford	3,759 12
Brimfield	3,096 52
Chester	6,655 05
Chicopee	7,521 62
East Longmeadow	2,613 41
Holyoke	2,759 01
Monson	50,875 34
Palmer	141,627 62
Russell	23,371 34
Wales	1,674 74
West Springfield	1,375 13
Westfield	9,426 32
Wilbraham	7,128 95

Hampshire County.

Amherst	6,717 83
Belchertown	2,300 90
Cummington	4,255 86
Easthampton	1,078 41
Goshen	1,467 98
Granby	5,885 30
Hadley	9,318 69
Hatfield	1,087 01
Huntington	8,783 39
Northampton	2,222 81
South Hadley	6,999 86
Southampton	467 65
Ware	13,946 88
Williamsburg	5,103 28

Middlesex County.

Acton	4,469 52
Arlington	311 95
Ashby	3,672 51
Ashland	2,667 68
Ayer	1,890 43
Bedford	1,894 85
Billerica	2,072 39
Boxborough	3,416 47
Burlington	2,374 25

Chelmsford	\$11,419 00
Concord	3,395 41
Dracut	3,290 34
Framingham	6,755 28
Groton	2,598 90
Holliston	4,462 39
Hudson	1,753 01
Lexington	4,875 62
Lincoln	1,466 44
Littleton	25,605 29
Lowell	6,708 35
Malden	181 32
Marlborough	7,891 64
Medford	459 74
Melrose	1,547 03
Natick	1,076 40
Newton	329 94
North Reading	1,411 24
Pepperell	2,676 22
Reading	2,528 50
Shirley	1,837 39
Somerville	2,605 67
Stoneham	1,656 20
Sudbury	3,081 54
Tewksbury	4,186 44
Townsend	4,409 60
Tyngsborough	10,472 88
Waltham	1,152 55
Watertown	991 88
Wayland	3,649 63
Westford	4,751 55
Weston	5,710 33
Wilmington	1,474 69
Winchester	27,565 82
Woburn	4,337 12

Nantucket County.

Nantucket	2,038 60
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Norfolk County.

Avon	1,281 62
Bellingham	3,415 84
Braintree	3,013 49
Canton	5,450 51
Cohasset	591 53
Dedham	4,249 49
Dover	2,005 07

Foxborough	\$1,761 19
Franklin	4,195 14
Holbrook	2,229 98
Milton	2,033 65
Needham	2,869 80
Norfolk	2,152 71
Norwood	4,027 85
Plainville	5,557 80
Quincy	1,697 28
Randolph	4,180 21
Sharon	321 90
Stoughton	23,467 82
Walpole	8,180 75
Wellesley	778 87
Westwood	1,094 89
Weymouth	4,652 95
Wrentham	10,590 41

Plymouth County.

Abington	2,343 33
Bridgewater	5,783 22
Brockton	2,916 48
Duxbury	3,392 73
East Bridgewater	2,781 25
Hanover	5,475 79
Hingham	3,560 14
Kingston	4,714 04
Lakeville	9,237 90
Marion	2,732 00
Marshfield	3,723 92
Mattapoisett	1,805 78
Middleborough	10,525 57
Norwell	451 73
Pembroke	2,774 22
Plymouth	8,908 49
Rochester	4,380 00
Rockland	5,366 37
Scituate	4,417 00
Wareham	8,987 55
West Bridgewater	3,837 88
Whitman	1,601 31

Suffolk County.

Boston	2,594 09
Chelsea	1,926 94
Revere	6,212 62

Worcester County.

Ashburnham	\$7,766 20
Athol	3,804 02
Auburn	8,017 30
Barre	4,526 01
Blackstone	3,490 19
Brookfield	21,105 71
Charlton	8,254 80
Douglas	2,045 01
Dudley	4,555 42
East Brookfield	2,468 55
Fitchburg	3,759 77
Gardner	1,834 02
Grafton	10,923 31
Hardwick	580 20
Harvard	2,572 55
Holden	6,704 11
Hopedale	1,388 69
Lancaster	2,310 09
Leicester	66,768 48
Leominster	4,494 94
Lunenburg	6,122 04
Mendon	1,151 97
Milford	4,216 21
Millbury	3,622 22
Millville	4,443 82
New Braintree	125 70
North Brookfield	1,826 36
Northborough	5,713 87
Northbridge	1,727 12
Oakham	1,293 84
Oxford	4,479 30
Paxton	3,292 51
Petersham	4,699 16
Phillipston	1,151 03
Princeton	727 61
Rutland	3,063 05
Shrewsbury	5,249 11
Southborough	2,703 53
Southbridge	546 67
Spencer	3,003 01
Sterling	9,143 10
Sturbridge	1,408 81
Sutton	8,216 33
Templeton	3,455 86
Upton	7,078 05
Uxbridge	6,532 85

Warren	\$3,365 67
Webster	1,761 87
West Boylston	2,619 78
West Brookfield	7,787 98
Westborough	2,023 52
Westminster	8,984 05
Winchendon	8,595 13
Worcester	7,175 72
Total	<u>\$1,952,606 56</u>

HIGHWAY IMPROVEMENTS AUTHORIZED BY SPECIAL ACTS.

The following contracts were entered into during the year for the construction of town ways under special acts of the Legislature: —

Ashfield.

Aug. 29, 1922, contract made with Thomas J. Quinn of Ashton, R. I., for the construction of 8,646 feet of the Plainfield road, under chapter 221 of the General Acts of 1915, as amended, the surface consisting of gravel 18 feet wide. This is to complete the 1921 contract taken from Alexander Palladino.

Expenditure during 1922, \$392.54.

Holyoke.

Aug. 29, 1922, contract made with Daniel O'Connell's Sons of Holyoke for the construction of 6,060 feet of the Easthampton road, under chapter 538 of the Acts of 1922, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$40,749.25.

Work about one-fourth completed.

Expenditure during 1922, \$11,287.63.

Middlefield.

Oct. 3, 1922, contract made with Wm. H. Hinman, Jr., of Medway for the construction of 3,250 feet of the Peru road, under chapter 221 of the General Acts of 1915, as amended, the surface consisting of hardpan 18 feet wide. The proposal amounted to \$23,953.70.

Work about one-fifth completed.

Expenditure during 1922, \$5,787.64.

† To this amount should be added \$2,613.52 for traffic census and \$7,877.78 for roadside planting.

Chelsea.

Oct. 3, 1922, contract made with the city of Chelsea for the construction of 1,800 feet of Summit and Crest avenues, under chapter 28 of the Resolves of 1922, the surface consisting of bituminous macadam 24 feet wide. The estimated cost amounted to \$15,000.

Expenditure during 1922, \$13.39.

Enfield.

Oct. 10, 1922, contract made with Lawrence J. Kelleher of Montague for the construction of 5,700 feet of the Ware road, under chapter 221 of the General Acts of 1915, as amended, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$35,205.

Expenditure during 1922, \$2,416.36.

Otis-Sandisfield.

Nov. 21, 1922, contract made with the Lane Construction Corporation of Meriden, Conn., for the construction of 19,706 feet of road in Otis and 20,213 feet of road in Sandisfield, under chapter 221 of the General Acts of 1915, as amended, the surface consisting of bituminous macadam 18 feet wide. The proposal amounted to \$307,415.20.

Expenditure during 1922, \$182.35.

Grafton.

Nov. 28, 1922, contract with the town of Grafton, sublet to the Middlesex Construction Company of Medford for the construction of 2,400 feet of the Westborough road, under chapter 539 of the Acts of 1922, the surface consisting of bituminous macadam varying from 18 to 21 feet wide. The proposal amounted to \$13,845.80.

No expenditures made during 1922.

FEDERAL AID IN CONSTRUCTING HIGHWAYS.

Statements as to the acts of Congress and of the Massachusetts Legislature with respect to co-operation between the United States and the States in the construction and main-

tenance of highways, including the Federal Highway Act approved Nov. 9, 1921, may be found in the annual reports of this Department for the years 1920 and 1921.

Reference is made to the provisions of an act of Congress, approved June 19, 1922, amending the Federal Highway Act aforesaid, printed on pages 74, 75 of this report.

The following Federal-aid allotments have thus far been made to Massachusetts:—

For fiscal year ending June 30, 1917	\$73,850 95
For fiscal year ending June 30, 1918	147,701 90
For fiscal year ending June 30, 1919	958,145 15
For fiscal year ending June 30, 1920	1,400,078 27
For fiscal year ending June 30, 1921	1,472,788 83
For fiscal year ending June 30, 1922	1,096,176 04
For fiscal year ending June 30, 1923	730,784 03
Total	\$5,879,525 17

The total amount received by Massachusetts from 1916 to Nov. 30, 1922, is \$2,754,453.77.

Projects to the number of 25 have been prepared in addition to those shown in the report of the Department of Public Works, Division of Highways, for 1921. The total mileage included in the various Federal-aid road projects in this State, from the commencement of work of this character to Nov. 30, 1922, inclusive, is 319.870. The mileage in the various counties is:—

COUNTY.	Miles.
Barnstable	30.605
Berkshire	47.753
Bristol	14.454
Dukes	3.134
Essex	47.885
Franklin	23.286
Hampden	16.231
Hampshire	20.077
Middlesex	29.279
Norfolk	23.160
Plymouth	14.738
Worcester	49.268
Total	319.870

STATEMENT OF FEDERAL-AID ROAD PROJECTS¹ TO NOV. 30, 1922.

No.	TOWN.	Miles.	Amount of Federal Aid involved.	Amount received.	Remarks.
1	Acushnet-Fairhaven	2.182	\$21,820 00	\$21,820 00	Work completed.
2	Hanover	2.708	19,480 36	19,480 36	Work completed.
3	Malden-Melrose-Saugus . .	1.162	11,620 00	11,620 00	Work completed.
4	Danvers	1.325	15,460 22	15,460 22	Work completed.
5	Windsor-Dalton	3.240	64,800 00	64,800 00	Work completed.
6	Sandwich	1.818	10,678 02	10,678 02	Work completed.
7	Cummington	4.659	86,816 53	86,816 53	Work completed.
8	Athol-Petersham	7.016	90,074 51	90,074 51	Work completed.
9	Saugus	3.122	65,472 27	65,472 27	Work completed.
10	Braintree	2.420	40,554 80	40,554 80	Work completed.
11	Concord-Acton-Littleton . .	4.849	77,600 87	77,600 87	Work completed.
12	Ipswich	2.173	21,851 50	21,851 50	Work completed.
13	Littleton-Groton	6.450	130,504 25	130,504 25	Work completed.
14	Barnstable	3.331	22,687 65	22,687 65	Work completed.
15	Norwell-Hingham	4.380	59,501 75	59,501 75	Work completed.
17	Lynnfield-Peabody	1.794	35,880 00	35,880 00	Work completed.
18	Lunenburg	2.797	55,940 00	33,903 53	Work completed.
19	Taunton	2.116	42,320 00	42,320 00	Work completed.
20	Tewksbury	2.909	35,211 82	35,211 82	Work completed.
21	Pittsfield-Hancock	3.637	72,740 00	51,179 13	Work completed.
22	Greenfield-Bernardston . .	6.426	88,270 71	88,270 71	Work completed.
23	Great Barrington	2.123	31,348 89	31,348 89	Work completed.
24	Seekonk	2.756	19,527 75	19,527 75	Work completed.
25	Billerica . . . . .	.578	38,389 77	38,389 77	Work completed.
26	Greenfield-Shelburne:				
	Section 1	5.134	102,680 00	102,680 00	Work completed.
	Section 2	4.401	88,020 00	72,708 60	Work completed.
27	Hamilton-Wenham	1.766	20,207 27	20,207 27	Work completed.
28	Lanesborough:				
	Section A . . . . .	.990	19,780 00	19,780 00	Work completed.
	Section B	2.680	53,800 00 ²	-	Project approved.
29	Ware	2.626	46,557 55	46,557 55	Work completed.
30	Brimfield	4.206	84,120 00 ²	-	Project approved.
31	Danvers-Peabody	1.107	22,140 00	22,140 00	Work completed.
32	Huntington	3.078	102,103 37	50,848 00	Work completed.

¹ All of these projects are now, or will be later, State highways. ² Signed agreements.

STATEMENT OF FEDERAL-AID ROAD PROJECTS — *Continued.*

No.	Town.	Miles.	Amount of Federal Aid involved.	Amount received.	Remarks.
33	Acton-Littleton:				
	Section A	2.182	\$43,640 00	\$43,640 00	Work completed.
	Section B	1.624	25,847 25	25,847 25	Work completed.
34	Dudley	1.359	27,180 00	27,180 00	Work completed.
35	Haverhill-Methuen . .	4.544	90,880 00	—	Project approved.
36	Eastham-Wellfleet-Truro-Provincetown:				
	Section A	10.690	91,347 85	91,347 85	Work completed.
	Section B	6.719	75,935 60 ¹	—	Project approved.
	Section C	8.047	86,130 51	34,052 30	3.6 miles completed.
37	Egremont	1.164	20,579 07	20,579 07	Work completed.
38	Peabody-Danvers . . .	2.827	56,540 00	56,540 00	Work completed.
39	Williamstown-New Ashford-Lanesborough:				
	Section A . . . .	.020	14,132 25	—	Work completed.
	Section B	3.323	66,460 00	—	Project approved.
	Section C	4.560	91,200 00	—	Project approved.
40	East Brookfield . . .	1.011	20,220 00	20,220 00	Work completed.
41	Ashby	1.250	22,141 03	22,141 03	Work completed.
42	Washington	2.291	45,820 00	45,820 00	Work completed.
43	Leicester . . . .	.638	12,760 00	12,760 00	Work completed.
44	Goshen-Cummington-Windsor:				
	Section A	1.494	29,880 00	—	Work under way.
	Section B	1.479	50,538 14	—	Work under way.
	Section C	3.780	82,915 42	—	Work under way.
45	Palmer:				
	Sections A and C . . .	1.795	35,900 00	35,900 00	Work completed.
	Section B . . . .	.530	10,600 00	—	Project approved.
46	Upton-Hopedale:				
	Section A	1.672	33,440 00	33,440 00	Work completed.
	Section B	2.589	51,780 00	—	Project approved.
47	Barre-Oakham	1.737	38,037 25	32,358 66	Work completed.
49	Middleborough	2.108	25,461 70	—	Project approved.
50	Lunenburg	1.763	35,260 00 ¹	—	Project approved.
51	Mendon-Uxbridge:				
	Section A	1.959	39,180 00	39,180 00	Work completed.
	Section B	2.504	50,080 00 ¹	—	Project approved.
52	Oxford	3.208	64,160 00	64,160 00	Work completed.

¹ Signed agreements.

STATEMENT OF FEDERAL-AID ROAD PROJECTS — *Continued.*

No.	TOWN.	Miles.	Amount of Federal Aid involved.	Amount received,	Remarks.
53	East Brookfield-Spencer-West Brookfield-Brookfield:				
	Section A . . . . .	.890	\$17,800 00	\$17,800 00	Work completed.
	Section B	1.682	33,640 00	33,640 00	Work completed.
54	Leicester:				
	Section A . . . . .	.829	16,580 00	16,580 00	Work completed.
	Section B	2.691	53,820 00 ¹	—	Project approved.
55	Quincy . . . . .	.549	10,980 00	10,980 00	Work completed.
56	Stoughton	2.141	42,820 00	42,820 00	Work completed.
57	Winchester-Woburn	3.042	59,131 31	59,131 31	Work completed.
58	Littleton	1.345	26,900 00	26,900 00	Work completed.
59	Egremont . . . . .	.784	15,680 00 ¹	—	Work completed.
60	Middleton-Danvers	1.907	38,224 70	38,224 70	Work completed.
61	Winchendon-Templeton . . .	5.393	107,860 00	90,081 12	Work completed.
62	Danvers-Topsfield:				
	Section A	3.009	60,180 00	43,036 98	Work completed.
	Section B	3.513	83,347 62	38,900 18	Work completed.
63	Essex-Ipswich	4.489	89,780 00	—	Project approved.
64	Norwood	1.065	21,300 00 ¹	—	Project approved.
65	North Adams	1.638	32,760 00	32,760 00	Work completed.
66	Uxbridge	1.168	23,360 00	—	Project approved, 67 and 68 withdrawn.
69	Haverhill	2.657	53,140 00	—	Work under way.
70	Palmer	2.550	51,000 00	22,917 83	Work under way.
71	Wrentham	1.846	36,940 00 ¹	—	Project approved.
72	Walpole	3.081	61,620 00	—	Project approved.
73	Southwick	6.879	135,027 64	83,395 50	Work under way.
74	Becket . . . . .	.156	16,233 38	—	Work under way.
75	Topsfield-Ipswich-Rowley- Newbury:				
	Section A	10.207	207,919 00	142,244 24	Work under way.
	Section B . . . . .	.350	7,000 00	—	Project approved.
76	Norfolk	1.447	28,940 00	—	Project approved.
77	Merrimac	1.020	20,400 00	—	Work under way.
78	Burlington	3.761	75,220 00 ¹	—	Project approved.
79	Great Barrington	2.991	59,820 00	—	Work under way.
80	Lee:				
	Section A . . . . .	.909	18,180 00	—	Work under way.
	Section B . . . . .	.284	5,680 00	—	Project approved.

¹ Signed agreements.

STATEMENT OF FEDERAL-AID ROAD PROJECTS — *Concluded.*

No.	TOWN.	Miles.	Amount of Federal Aid involved.	Amount received.	Remarks.
81	Deerfield . . . . .	.710	\$14,200 00	—	Project sent.
82	Whately	1.756	35,120 00	—	Project sent.
83	Pembroke	1.402	28,040 00	—	Project approved.
84	Sterling-West Boylston . .	3.491	59,637 13	—	Work under way.
85	Dalton (Hinsdale Road):				
	Section A . . . . .	.967	19,340 00	—	Work under way.
	Section B . . . . .	.065	4,400 00	—	Project approved.
86	Gay Head	3.134	43,312 50	—	Project approved.
87	Dalton (Windsor Road):				
	Section A	1.056	21,120 00	—	Work under way.
	Section B . . . . .	.024	6,980 00	—	Project approved.
88	Erving	4.859	97,180 00	—	Project approved.
89	Easton:				
	Sections A and B	3.540	70,800 00	—	Work under way.
	Section C	3.860	77,200 00	—	Project approved.
90	Brookfield-East Brookfield .	1.231	24,870 00	—	Project approved.
91	Lowell . . . . .	.977	19,540 00	—	Work under way.
92	Bellingham	5.250	105,000 00	—	Project approved.
93	Wilbraham . . . . .	.123	61,758 81	—	Project sent.
94	Otis-Sandisfield	7.565	122,931 25 ¹	—	Project approved.
95	Westfield . . . . .	.148	12,677 08	—	Project approved.
96	Rochester-Wareham	4.140	70,275 00	—	Project approved.
97	—	—	—	—	Withdrawn.
98	Sheffield	3.052	54,095 00	—	Project approved.
99	Gloucester	1.225	19,906 25	—	Project approved.
100	Rutland	3.640	59,150 00	—	Project approved.
101	Hinsdale	1.194	26,902 50	—	Project sent.
102	Plainville-Wrentham	5.361	87,116 25	—	Project sent.
103	Adams . . . . .	.568	9,230 00	—	Project sent.
	Southampton	5.433	88,286 25	—	Project sent.
	Totals	319.870	\$5,786,357 60	\$2,754,453 77	

¹ Signed agreements.

BRIDGES.

During the year the Division has prepared designs and plans for, and done other work relating to, bridges throughout the Commonwealth. The various towns, the localities therein, the character of the structure and other details are as follows: —

BRIDGES BUILT OR CONTRACTED FOR.

TOWN.	Locality.	Character of Structure.
Becket . . .	Over West Branch of Westfield River.	40-foot concrete beam.
Becket . . .	Over West Branch of Westfield River.	26-foot concrete beam.
Becket . . .	Over West Branch of Westfield River.	25-foot concrete beam.
Cummington . . .	Over East Branch of Westfield River.	80-foot concrete arch.
Cummington . . .	Over East Branch of Westfield River.	37-foot span concrete beam.
Cummington . . .	Over Westfield River . . .	38-foot concrete beam.
Cummington . . .	Over Town Brook . . .	14-foot concrete beam.
Easton . . .	Over Black Brook . . .	12-foot concrete slab.
Falmouth . . .	Over Coonemosset River . . .	12½-foot concrete slab.
Goshen . . .	Over Stone's Brook . . .	30-foot concrete beam.
Goshen . . .	Over Stone's Brook . . .	35-foot concrete beam.
Hingham . . .	At Otis and Summer streets	Sea wall and extension of bridges.
Holden . . .	Over Quinnapoxett River . . .	35-foot concrete beam.
Middleton . . .	Over Ipswich River . . .	24½-foot concrete beam.
Newbury . . .	Over Little River . . .	21-foot concrete beam.
Otis . . .	Over brook . . .	15½-foot concrete beam.
Otis . . .	Over brook . . .	13-foot concrete beam.
Otis . . .	Over brook . . .	12-foot concrete slab.
Southwick . . .	Over brook . . .	13-foot concrete beam.
Southwick . . .	Over Great Brook . . .	10-foot concrete slab.
Southwick . . .	Over Uncle Oliver's Brook . . .	10-foot concrete slab.
Southwick . . .	Over Uncle Oliver's Brook . . .	23½-foot concrete beam.
Sutton . . .	Over Cold Spring Brook . . .	14-foot concrete beam.
Topsfield . . .	Over Howlett Brook . . .	8-foot cement rubble masonry.
Topsfield . . .	Newburyport Turnpike, over Howlett Street.	20-foot concrete beam.
Topsfield . . .	Over Mile Brook . . .	10-foot concrete slab.
Windsor . . .	Over Westfield River . . .	20½-foot concrete beam.

ALTERATIONS, REPAIRS AND EXTENSIONS TO BRIDGES COMPLETED IN
1922.

TOWN.	Locality.	Character of Work.
Fall River . . .	Brightman Street bridge .	Dolphins and fender pier repairs.
Fall River . . .	Brightman Street bridge .	Maintenance repairs.
Haverhill . . .	Over Millvale Brook . .	Extension of a 15-foot concrete beam.
Newburyport . .	Over Merrimack River . .	Maintenance repairs.
Rowley (Newbury line)	Over Mill River . . .	Extension of 18-foot concrete stone arch.
Shelburne (Buckland line).	Over Deerfield River . .	Repairs to 125-foot iron truss.
Shelburne . . .	Over Dragon Brook . . .	Extension of 12½-foot concrete slab.
Southwick . . .	Over Webb Brook . . .	Extension of 7½-foot concrete slab.
Southwick . . .	Over brook	Extension of 8-foot concrete slab.
Topsfield . . .	Over Ipswich River . . .	Alterations (concrete) to 32-foot stone arch.

CONTEMPLATED BRIDGES AND STRUCTURES.

Plans, Studies or Estimates made.

TOWN.	Locality.	Character of Structure.
Becket	Over Sparks Brook . . .	Extension of 13-foot concrete beam.
Bernardston . .	Over Falls River . . .	60-foot concrete arch.
Brimfield . . .	Over Mill Brook	17½-foot concrete beam.
Bourne	Over New York, New Haven & Hartford Railroad.	33-foot concrete beam; alternate, 34½-foot concrete beam.
Conway	Over South River	82-foot bridge.
Dalton	Over Housatonic River . .	70-foot concrete arch.
Dalton	Over branch of Housatonic River.	45-foot concrete beam.
Dalton	Over Housatonic River . .	40-foot concrete beam.
Dalton	Over branch of Housatonic River.	2-span concrete beam, each span 25 feet.
Dana	Over Ware River	19-foot concrete beam; alternate of wood.
East Brookfield .	Over Dunn Brook	Extension of superstructure.
Essex	Over causeway	Riprap or wall.
Gill	Over brook	10-foot 8-inch concrete slab.
Grafton	Over brook	12-foot concrete slab.
Harwich	Over Herring River . . .	118-foot steel truss.
Hinsdale	Over B. and A. Railroad .	Plate girder, 46-foot span.
Hinsdale	Over Housatonic River . .	32-foot concrete beam.
Hudson	Over Assabet River . . .	2-span concrete beam, each span 32 feet 9 inches.
Huntington . . .	Culver bridge	Advice as to repairs.

CONTEMPLATED BRIDGES AND STRUCTURES — *Continued.**Plans, Studies or Estimates made — Concluded.*

TOWN.	Locality.	Character of Structure.
Newbury (Old Town)	Parker River . . .	3-span concrete arch, 2 spans 90 feet each, 1 span 110 feet.
Northbridge . . .	Over Blackstone River . .	2-span concrete beam, each span 39 feet; alternate, 78-foot concrete arch or 2-span concrete slab, each span 47 feet.
Otis	West Branch of Farmington River.	Drainage data.
Wareham	Over Weweantic River . .	25-foot concrete beam.
Westfield	Over Westfield River . .	36-foot concrete beam.

Examinations, Reports, Estimates, etc., at Request of Cities and Towns.

CITIES AND TOWNS.	Locality.	Character of Work.
Attleboro	Over Bungay River . . .	Examination of plans and advice as to construction.
Bellingham	Over Charles River . . .	On condition of bridge and advice on repairs.
Falmouth	Over Childs River . . .	Repairs to wooden bridge.
Falmouth	Over Neck River . . .	Plans and specifications prepared for 20-foot concrete beam.
Grafton	Over Blackstone River . .	Plans and specifications prepared for 2-span concrete beam, each span 39½ feet.
Granby	Over Batchelor Brook . .	On condition of bridge and necessary reconstruction.
Hopkinton	Over railroad	On condition and reconstruction.
Maynard	Over Assabet River . . .	2-span concrete beam, each span 26 feet 9 inches. Construction supervised.
Maynard	Over Assabet River . . .	73-foot concrete arch. Construction supervised.
Medway	Over Charles River . . .	Condition and necessary repairs to 61-foot steel bridge.
Middleborough . .	Over Taunton River (Bridge-water line), Titicut bridge.	3-span concrete beam, spans 35 feet each.
New Salem	Over Moose Horn Brook . .	Condition and reconstruction.
Northborough-West-borough.	Over Assabet River . . .	Strength and traffic conditions.
North Reading . . .	Washington Street . . .	Condition and necessary repairs.
Petersham	Over Swift River	Condition and necessary repairs to wooden truss bridge.
Plymouth	Over Eel River	26-foot 10-inch concrete beam with split stone and rubble abutments. Construction supervised.
Royalston	Over Millers River	2-span concrete beam, 1 span 35.75 feet and 1 span 33.5 feet. Construction supervised.
Shelburne	Over Deerfield River (Buckland line).	Repairs, painting and wood block floor. Work supervised.
Sherborn	Over Beaver Dam Brook . .	Condition and reconstruction.
Stockbridge	Over Housatonic River . .	Condition of four iron bridges.
Townsend	Bayberry Hill Brook . .	Reconstruction or repairs to wooden bridge.
West Brookfield . .	Over Quaboag River . . .	Reconstruction of wooden bridge.
Wilbraham	Over canal	Condition and necessary repairs.
Woburn	Over Aberjona River . . .	Construction of concrete beam, 15-foot span. Construction supervised.

CONTEMPLATED BRIDGES AND STRUCTURES — *Concluded.**Examinations, Reports, Estimates, etc., in Accordance with Legislation.*

CITIES AND TOWNS.	Locality.	Character of Work.
Quincy-Boston . . .	Old Colony Boulevard (ch. 35, Resolves of 1922).	Estimates for bridge with draw span, 1,500 feet long.

Examinations, Reports, Estimates, etc., at Request of County Commissioners.

CITIES AND TOWNS.	Locality.	Character of Work.
Barre	Over Ware River . . .	On condition of bridge and reconstruction necessary.
Dover-Needham . . .	Over Charles River . . .	2-span concrete beam, each span 31 feet. Construction supervised.
Reading	Lowell Street, Boston & Maine bridge.	Reconstruction.
Stow	Over Assabet River, near Gleasondale Mills.	Reconstruction of two bridges.

Other Examinations and Reports by Direction of the Department.

CITIES AND TOWNS.	Locality.	Subject.
Cambridge	Over Charles River . . .	Examination of structure and condition of floor, Harvard bridge.
Haverhill	Over Merrimack River (Bradford line).	On condition and strength of bridge.
Lowell	At First Street	Culverts for water main.
Monterey	Over Brook	Repairs needed on small bridge.
Newbury	Over Parker River . . .	Widening of 4-span concrete beam, each span 45 feet.
North Reading . . .	Railroad bridge	Necessary repairs.
Wareham	Weweantic River	Repairs to Tremont bridge.
Wareham	Butler's Crossing	Repairs to bridge.
West Brookfield . . .	Makepeace Crossing, Boston & Albany Railroad.	Reconstruction of bridge.
Winchendon	Over Millers River . . .	Condition and reconstruction of two bridges.

BRIDGE OVER THE MERRIMACK RIVER BETWEEN NEWBURYPORT
AND SALISBURY.

The charge of this bridge was placed in the Massachusetts Highway Commission, and the same made a State highway by the provisions of chapter 716, Acts of 1912, which also provided that the expense of keeping the bridge in good repair for

travel, of operating the draw and of maintaining the bridge shall be paid by the Commonwealth.

The expenditures for 1922 were \$8,465.94.

The total expenditures from 1912 to 1922, inclusive, were \$78,423.38.

BRIDGE OVER TAUNTON GREAT RIVER BETWEEN FALL RIVER AND SOMERSET.

The charge of this bridge was placed in the Massachusetts Highway Commission, and the same made a State highway by the provisions of chapter 717, Acts of 1912, which also provided that the expense of keeping the bridge in good repair for travel, and of operating the draw and maintaining the bridge shall be paid by the Commonwealth; furthermore, that the expense incurred and to be incurred by the county of Bristol in restoring the bridge to a sound condition and in making it suitable for travel shall be borne by the Commonwealth.

The expenditures for 1922 were \$13,988.90.

The total expenditures from 1912 to 1922, inclusive, were \$169,561.70.

CONSTRUCTION AND REPAIR OF TOWN AND COUNTY WAYS.

(Section 34, chapter 90, General Laws, as revised by section 1¹, chapter 112, Acts of 1921.)

During the year the Division has contracted for work to be done in the towns named in the following table, which also shows the type of road, the length contracted for, and the allotments or contributions by the State, towns and counties:—

COUNTIES AND TOWNS.	CONTRIBUTIONS.			Type of Road.	Length Con- tracted for (Feet).
	State.	Town.	County.		
<i>Barnstable County.</i>					
Brewster . .	\$3,000 00	\$3,000 00	—	Bituminous concrete .	7,154
Falmouth . .	7,500 00	2,500 00	—	Bridge and approaches .	625
Falmouth . .	600 00	600 00	—	Bituminous concrete .	2,175
Mashpee . .	873 39	873 39	\$873 39	Grading	20,259
Yarmouth . .	30,000 00	30,000 00	—	Bituminous macadam .	18,750

COUNTIES AND TOWNS.	CONTRIBUTIONS.			Type of Road.	Length Con- tracted for (Feet).
	State.	Town.	County.		
<i>Berkshire County.</i>					
Hancock . . . {	\$750 00 ¹	—	\$1,000 00	Gravel	3,950
	1,250 00				
Monterey . . . {	1,300 00 ¹	—	4,000 00	Gravel	1,300
	3,700 00				
Monterey . . .	500 00	\$500 00	—	Repairs and oiling . .	13,728
New Marlborough {	2,125 00 ¹	1,500 00	2,000 00	Gravel	2,800
	1,375 00				
Otis {	1,400 00 ¹	500 00	4,500 00	Gravel	3,600
	4,100 00				
Richmond . . . {	900 00 ¹	1,000 00	—	Grading	600
	600 00				
Tyringham . . . {	625 00 ¹	1,000 00	1,000 00	Water-bound macadam .	1,217
	375 00				
West Stockbridge {	950 00 ¹	2,000 00	2,000 00	Gravel	3,050
	1,050 00				
<i>Bristol County.</i>					
Acushnet . . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	3,200
Acushnet . . .	600 00	600 00	600 00	Repairs and oiling . .	15,840
Berkley	1,500 00	1,500 00	—	Repairs and oiling . .	33,205
Dartmouth . . .	5,000 00	5,000 00	—	Bituminous macadam .	5,250
Dighton	7,000 00	14,000 00	—	Water-bound macadam .	4,646
Easton	4,000 00	4,000 00	—	Bituminous macadam .	1,400
Freetown	1,000 00	1,000 00	—	Repairs and oiling . .	14,475
Raynham {	1,100 00 ¹	3,000 00	\$3,000 00	Bituminous macadam .	1,760
	1,900 00				
<i>Dukes County.</i>					
Chilmark	12,000 00	6,000 00	6,000 00	Bituminous concrete .	8,556
<i>Essex County.</i>					
Amesbury	10,000 00	10,000 00	10,000 00	Bituminous macadam .	4,350
Boxford	1,000 00	1,000 00	1,000 00	Gravel	1,485
Danvers	10,000 00	10,000 00	10,000 00	Bituminous macadam .	4,900
Essex	1,800 00	1,800 00	—	Repairs and oiling . .	38,121
Georgetown . . .	2,500 00	2,500 00	2,500 00	Gravel	6,400
Merrimac	2,500 00	500 00	—	Repairs and oiling . .	3,200
Methuen	10,000 00	10,000 00	10,000 00	Bituminous macadam .	3,806
Middleton	20,000 00	—	20,000 00	{ Bituminous macadam .	5,583
				{ Bridge and approaches .	100

¹ Allotment made from funds available under the provisions of sections 26 to 29, chapter 81 of the General Laws.

COUNTIES AND TOWNS.	CONTRIBUTIONS.			Type of Road.	Length Con- tracted for (Feet).
	State.	Town.	County.		
Franklin County.					
Ashfield . . .	\$1,000 00	\$1,000 00	-	Gravel	700
Buckland . . .	3,500 00	3,500 00	-	Gravel	2,600
Monroe . . {	450 00 ¹	1,000 00	-	Gravel	1,900
	550 00				
Montague . . .	2,000 00	2,500 00	-	Gravel	4,500
Orange . . .	1,000 00	1,000 00	-	Gravel	1,800
Whately . . .	3,000 00	3,000 00	-	{ Bituminous macadam .	1,247
				{ Gravel	400
Hampden County.					
Brimfield . . .	5,000 00	-	-	Gravel	4,300
East Longmeadow	4,200 00	4,200 00	-	Gravel	4,590
Longmeadow . .	40,000 00	20,000 00	\$20,000 00	Cement concrete . .	6,200
West Springfield .	35,000 00	35,000 00	35,000 00	Cement concrete . .	9,994
Wilbraham . . .	10,000 00	10,000 00	-	Bituminous macadam .	6,313
Hampshire County.					
Hatfield . . .	5,000 00	5,000 00	-	Bituminous macadam .	2,763
Worthington . {	1,775 00 ¹	1,000 00	-	Repairs and oiling . .	31,680
	1,225 00				
Middlesex County.					
Acton . . .	10,000 00	10,000 00	\$10,000 00	Bituminous macadam .	3,400
Ashby . . {	1,425 00 ¹	2,350 00	2,350 00	Gravel	4,375
	925 00				
Ashland . {	500 00 ¹	2,500 00	2,500 00	Bituminous macadam .	900
	2,000 00				
Ayer . . .	6,000 00	6,000 00	6,000 00	Bituminous macadam .	3,300
Bedford . . .	1,000 00	1,000 00	1,000 00	Gravel	1,560
Bedford . . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	2,000
Boxborough . .	500 00	500 00	500 00	Gravel	1,100
Burlington . .	1,100 00	1,100 00	1,100 00	Repairs and oiling . .	17,952
Burlington . .	2,000 00	2,000 00	2,000 00	Gravel	3,250
Carlisle . . .	500 00	500 00	500 00	Gravel	1,000
Chelmsford . .	17,000 00	17,000 00	17,000 00	Bituminous macadam .	9,700
Dracut . . .	2,000 00	2,000 00	2,000 00	Bituminous macadam .	1,000
Dunstable . . .	1,750 00	1,750 00	1,750 00	Repairs and oiling . .	38,016
Framingham . .	2,300 00	2,300 00	2,300 00	Gravel	3,000
Framingham . .	4,200 00	4,200 00	4,200 00	Bituminous macadam .	2,200
Holliston . . .	2,500 00	2,500 00	2,500 00	Gravel	3,200

¹ Allotment made from funds available under the provisions of sections 26 to 29, chapter 81 of the General Laws.

COUNTIES AND TOWNS.	CONTRIBUTIONS.			Type of Road.	Length Contracted for (Feet).
	State.	Town.	County.		
<i>Middlesex County—</i> Con.					
Hopkinton . .	\$4,000 00	\$4,000 00	\$4,000 00	Water-bound macadam .	3,000
Hudson . . .	3,300 00	3,300 00	3,300 00	Gravel	4,110
Lexington . .	20,000 00	25,000 00	20,000 00	Bituminous macadam .	9,952
Lincoln . . .	7,500 00	7,500 00	7,500 00	Bituminous macadam .	4,800
Littleton . .	2,000 00	2,000 00	2,000 00	Gravel	5,000
Maynard . . .	4,500 00	4,500 00	4,500 00	Bridge	96
Maynard . . .	1,500 00	1,500 00	1,500 00	Gravel	2,700
Natick	2,000 00	2,000 00	2,000 00	Bituminous macadam .	2,500
North Reading .	1,200 00	1,200 00	1,200 00	Repairs and oiling . .	48,840
Pepperell . .	1,400 00	1,400 00	1,400 00	Gravel	2,000
Shirley	17,500 00	17,500 00	17,500 00	Bituminous macadam .	7,850
Stow {	1,150 00 ¹	2,500 00	2,500 00	Bituminous macadam .	1,500
	1,350 00 }				
Sudbury . . .	4,000 00	4,000 00	4,000 00	Gravel	8,700
Sudbury . . .	1,600 00	1,600 00	1,600 00	Repairs and oiling . .	29,832
Tyngsborough .	500 00	500 00	500 00	Repairs and oiling . .	23,760
Wakefield . .	3,000 00	3,000 00	3,000 00	Bituminous macadam .	2,000
Wayland . . .	4,000 00	4,000 00	4,000 00	Repairs and oiling . .	55,440
Westford . . .	2,250 00	2,250 00	2,250 00	Repairs and oiling . .	40,900
Wilmington . {	1,100 00 ¹	2,000 00	2,000 00	Water-bound macadam .	2,000
	900 00 }				
<i>Norfolk County.</i>					
Foxborough . .	10,000 00	10,000 00	10,000 00	Bituminous macadam .	6,000
Franklin . . .	4,000 00	4,000 00	4,000 00	Gravel	4,600
Holbrook . . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	1,850
Medway	3,000 00	3,000 00	3,000 00	Gravel	4,377
Millis	1,000 00	1,000 00	1,000 00	Repairs and oiling . .	22,958
Millis	3,000 00	3,000 00	3,000 00	Gravel	3,900
Norfolk . . . {	1,125 00 ¹	2,500 00	2,500 00	Gravel	3,800
	1,375 00 }				
Norwood . . .	5,000 00	10,000 00	5,000 00	Bituminous macadam .	4,400
Sharon	3,000 00	3,000 00	3,000 00	Bituminous macadam .	1,645
Stoughton . .	8,000 00	8,000 00	8,000 00	Bituminous macadam .	4,665
Walpole	5,000 00	11,000 00	5,000 00	Bituminous concrete .	8,037
Westwood . . .	4,000 00	8,000 00	4,000 00	Bituminous macadam .	3,400
Wrentham . . .	3,500 00	3,500 00	3,500 00	Gravel	4,550
Wrentham . . .	2,500 00	2,500 00	2,500 00	Bituminous macadam .	1,225

¹ Allotment made from funds available under the provisions of sections 26 to 29, chapter 81 of the General Laws.

COUNTIES AND TOWNS.	CONTRIBUTIONS.			Type of Road.	Length Con- tracted for (Feet).
	State.	Town.	County.		
<i>Plymouth County.</i>					
Abington . . .	\$6,600 00	\$6,600 00	\$6,600 00	Bituminous macadam .	5,629
Bridgewater . .	1,330 00	1,330 00	1,330 00	Bituminous macadam .	1,255
Carver . . .	3,500 00	3,500 00	—	Bituminous concrete .	3,091
Hanson . . .	4,000 00	4,000 00	4,000 00	Water-bound macadam .	4,875
Norwell . . .	5,000 00	5,000 00	5,000 00	Water-bound macadam .	8,055
Plymouth . . .	3,000 00	6,000 00	3,000 00	Bridge and approaches .	393
Rockland . . .	7,000 00	7,000 00	7,000 00	Bituminous macadam .	5,425
West Bridgewater .	5,000 00	5,000 00	—	Bituminous concrete .	1,900
<i>Worcester County.</i>					
Ashburnham . .	16,000 00	8,000 00	8,000 00	Bituminous macadam .	4,221
Berlin . . . {	975 00 ¹ 2,525 00	3,500 00	3,500 00	Bituminous macadam .	4,000
Boylston . . .	2,000 00	2,000 00	2,000 00	Repairs and oiling . .	38,016
Dudley . . .	400 00	400 00	—	Repairs and oiling . .	8,800
Gardner . . .	2,500 00	2,500 00	—	Bituminous macadam .	1,700
Holden . . .	30,000 00	10,500 00	19,500 00	Bituminous macadam .	7,606
Leicester . . .	12,000 00	12,000 00	12,000 00	Bituminous macadam .	4,300
Milford . . .	10,000 00	10,000 00	10,000 00	Bituminous macadam .	6,540
New Braintree {	1,250 00 ¹ 4,750 00	2,000 00	6,000 00	Bituminous macadam .	2,600
Northborough . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	1,980
Paxton . . .	2,000 00	2,000 00	2,000 00	Gravel	3,000
Petersham . . {	1,750 00 ¹ 750 00	2,500 00	2,500 00	Gravel	3,900
Shrewsbury . . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	2,850
Sutton . . .	30,000 00	10,000 00	20,000 00	Cement concrete . .	6,133
Westborough . .	5,000 00	5,000 00	5,000 00	Bituminous macadam .	2,300
West Brookfield .	225 00	225 00	—	Repairs and oiling . .	4,106

¹ Allotment made from funds available under the provisions of sections 26 to 29, chapter 81 of the General Laws.

The expenditures during the year in various counties were:—

COUNTY.	Amount.
Barnstable	\$35,181 39
Berkshire	31,221 90
Bristol	30,580 68

COUNTY.	Amount.
Dukes	\$10,916 28
Essex	53,850 62
Franklin	41,867 95
Hampden	125,399 92
Hampshire	8,026 44
Middlesex	131,989 02
Norfolk	67,590 07
Plymouth	48,423 35
Suffolk	27 16
Worcester	117,140 55

Details of the foregoing expenditures follow: —

Barnstable County.

Brewster	\$3,000 00
Falmouth	10,285 99
Mashpee	1,395 40
Sandwich	1,000 00
Yarmouth	19,500 00

Berkshire County.

Egremont	288 24
Hancock	1,250 00
Hinsdale	4,521 26
Lanesborough	7,262 70
Monterey	4,170 74
New Ashford	602 18
New Marlborough	2,375 00
Otis	500 00
Peru	5,679 21
Richmond	600 00
Tyringham	375 00
West Stockbridge	3,050 00
Williamstown	547 57

Bristol County.

Acushnet	5,600 00
Berkley	1,500 00
Dartmouth	5,920 32
Dighton	7,000 00
Easton	4,760 89
Freetown	1,000 00
Raynham	1,900 00
Seekonk	2,899 47

Dukes County.

Chilmark	\$10,916 28
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Essex County.

Amesbury	5,000 00
Boxford	1,000 00
Danvers	2,353 99
Essex	9,800 00
Georgetown	5,000 00
Lynnfield	2,963 34
Marblehead	356 79
Methuen	6,692 57
Middleton	19,832 16
Swampscott	851 77

Franklin County.

Ashfield	26,001 46
Bernardston	6,469 67
Buckland	1,500 00
Colrain	800 00
Conway	1,602 15
Monroe	546 20
New Salem	3,464 02
Orange	984 45
Wendell	500 00

Hampden County.

Agawam	28,406 57
Brimfield	3,683 34
East Longmeadow	6,097 88
Holyoke	11,287 63
Longmeadow	32,000 00
Monson	2,427 95
Westfield	680 85
West Springfield	25,819 47
Wilbraham	14,996 23

Hampshire County.

Belchertown	1,926 08
Hatfield	5,000 00
Worthington	1,100 36

Middlesex County.

Acton	10,937 99
Ashby	1,000 00
Ashland	2,010 80
Ayer	5,777 44
Bedford	6,080 64

Boxborough	\$700 00
Burlington	4,693 77
Carlisle	500 00
Chelmsford	16,657 32
Dracut	2,000 00
Dunstable	1,750 00
Framingham	6,944 95
Holliston	4,000 00
Hopkinton	4,000 00
Hudson	3,300 00
Lexington	10,900 00
Lincoln	6,683 33
Littleton	2,954 69
Maynard	4,514 76
Natick	2,166 64
North Reading	1,131 74
Pepperell	1,400 00
Shirley	13,257 30
Stow	1,350 00
Sudbury	2,700 00
Tyngsborough	500 00
Wakefield	2,999 57
Wayland	5,662 93
Westford	4,515 15
Wilmington	900 00

Norfolk County.

Braintree	1,911 65
Canton	2,948 51
Foxborough	4,940 81
Franklin	4,000 00
Holbrook	6,468 99
Medway	3,000 00
Millis	3,052 15
Norfolk	1,868 59
Norwood	5,000 00
Randolph	885 92
Sharon	3,408 93
Stoughton	13,168 02
Walpole	6,151 35
Wrentham	10,785 15

Plymouth County.

Abington	6,600 00
Bridgewater	1,330 00
Carver	6,500 00
East Bridgewater	2,416 67
Hanover	1,500 00

Hanson	\$3,999 82
Norwell	718 00
Pembroke	8,320 17
Plympton	4,959 85
Rockland	7,000 00
Wareham	78 84
West Bridgewater	5,000 00

Suffolk County.

Revere	27 16
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Worcester County.

Barre	2,000 00
Bolton	1,000 00
Boylston	2,000 00
Dana	700 00
Dudley	1,224 19
Gardner	2,500 00
Hardwick	20,000 00
Harvard	9,000 00
Holden	42,906 91
Leicester	3,836 18
Mendon	490 23
Milford	7,947 33
Millbury	6,000 00
New Braintree	2,869 80
Northborough	1,900 00
Oxford	1,300 00
Petersham	1,070 43
Shrewsbury	3,670 48
Sterling	2,000 00
West Brookfield	225 00
Westborough	3,500 00
Westminster	1,000 00

 \$702,215 33

Engineering	36,594 11
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Total	\$738,809 44
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HIGHWAYS IN THE FIVE WESTERN COUNTIES.

(Chapter 221, General Acts of 1915.)

Chapter 572, Acts of 1920, provided that —

For the purpose of completing the construction of certain highways in the five western counties under the provisions of chapter two hundred and twenty-one of the General Acts of nineteen hundred and fifteen, the

division of highways of the department of public works, may expend an additional sum of one million dollars before November thirtieth, nineteen hundred and twenty-four.

The total expenditures during the year for the construction of highways in Sheffield; Windsor and Dalton; Otis and Sandisfield; Washington; Worthington and Huntington; Worthington and Hinsdale; Plainfield and Cummington; Belchertown, Palmer, Ware and Enfield; Southwick and Granville; Ashfield; Gill; Barre and Oakham; Warwick; Chesterfield; and Middlefield were \$246,253.20, details of which follow: —

Route No. 1.

Sheffield	\$49 81
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Route No. 2.

Windsor	3,499 09
Dalton	3,499 09

Route No. 3.

Otis	135 76
Sandisfield	135 76

Route No. 4.

Washington	27,174 79
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Route No. 5.

Worthington	1,031 78
Huntington	7,372 90

Route No. 6.

Worthington	1,960 62
Hinsdale	45 51

Route No. 7.

Plainfield	45,080 37
Cummington	26,475 77

Route No. 8.

Belchertown	792 68
Palmer	39 45
Ware	39 45
Enfield	2,416 36

Route No. 9.

Southwick	44,433 45
Granville	81 10

Route No. 10.

Ashfield	413 64
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Route No. 11.

Gill \$26,173 30

Route No. 12.

Barre 19,992 61

Oakham 1,977 29

Route No. 14.

Warwick 361 96

Route No. 17.

Chesterfield 27,283 02

Middlefield 5,787 64

Total \$246,253 20

CONSTRUCTION AND REPAIR OF WAYS NOT STATE HIGH- WAYS IN CERTAIN TOWNS.

(Section 23, ¹ chapter 81, General Laws.)

During the year the Division contracted for work to be done in the town named in the following table, which also shows the type of road, the length contracted for, and the allotment or contribution made by the State and town: —

TOWN.	CONTRIBUTIONS.		Type of Road.	Length contracted for (Feet).
	State.	Town.		
Nantucket	\$30,000	\$20,000	Bituminous concrete .	21,297

The expenditures during the year in various towns in Berkshire, Hampden and Nantucket counties were as follows: —

Berkshire County.

Mount Washington \$854 53

Hampden County.

Granville 455 75

Palmer 315 96

Wilbraham 550 31

Nantucket County.

Nantucket 11,555 04

Total \$13,731 59

REPAIR AND IMPROVEMENT OF PUBLIC WAYS, EXCLUSIVE
OF STATE HIGHWAYS, IN CERTAIN TOWNS.

(Sections 26 to 29 and 31 of chapter 81 of the General Laws, as amended, with reference to section 26, by section 1 of chapter 120, Acts of 1921, and by chapter 281, Acts of 1922.)

The amendment of section 26 aforesaid, in 1922, was as follows: —

Section twenty-six of chapter eighty-one of the General Laws is hereby amended by striking out, in the fifth line, the word “fifty”, and inserting in place thereof the word: — seventy, — by striking out, in the sixth line, the word “fifty”, and inserting in place thereof the word: — seventy-five, — and by inserting after the word “dollars”, in the twenty-sixth line, the following new paragraphs: — 9. Fifty thousand dollars and less than sixty thousand dollars, one hundred and fifty dollars. 10. Sixty thousand dollars and less than seventy thousand dollars, one hundred and seventy-five dollars, — so as to read as follows: — *Section 26.* There may be expended for the repair and improvement of public ways, other than state highways, in towns the valuation of which is less than three million dollars and in which the amount of such valuation, divided by the number of miles of such public ways, hereinafter referred to as the road mileage valuation, is less than seventy thousand dollars, such sums, not exceeding seventy-five dollars per mile, as the general court may appropriate therefor; provided, that such towns shall contribute or make available for use in connection therewith the following amounts for each mile of said public ways within their respective limits, according to the following schedule based on their road mileage valuation:

1. Less than five thousand dollars, twelve dollars and fifty cents.
2. Five thousand dollars and less than seven thousand five hundred dollars, fifteen dollars.
3. Seven thousand five hundred dollars and less than ten thousand dollars, twenty-five dollars.
4. Ten thousand dollars and less than fifteen thousand dollars, forty dollars.
5. Fifteen thousand dollars and less than twenty thousand dollars, fifty dollars.
6. Twenty thousand dollars and less than thirty thousand dollars, seventy-five dollars.
7. Thirty thousand dollars and less than forty thousand dollars, one hundred dollars.
8. Forty thousand dollars and less than fifty thousand dollars, one hundred and twenty-five dollars.
9. Fifty thousand dollars and less than sixty thousand dollars, one hundred and fifty dollars.
10. Sixty thousand dollars and less than seventy thousand dollars, one hundred and seventy-five dollars.

The amounts appropriated as aforesaid and contributed by the towns shall be expended under the direction of the division on such ways as the division and the selectmen of the towns may agree upon.

[Approved April 13, 1922.]

During the year the Division has contracted for work to be done in the towns named in the following table, which also shows the allotments or contributions by the State and towns:—

COUNTIES AND TOWNS.	ALLOTMENTS.	
	State.	Town.
Barnstable County:		
Eastham	\$1,950 00	\$1,950 00
Truro	3,100 00	2,480 00
Wellfleet	1,750 00	2,625 00
Berkshire County:		
Alford	1,400 00	1,200 00
Becket	3,000 00	2,400 00
Cheshire	4,050 00	5,050 00
Egremont	1,550 00	2,325 00
Florida	2,100 00	4,200 00
Hancock	1,500 00	1,200 00
Hinsdale	1,800 00	2,700 00
Lanesborough	2,050 00	3,075 00
Monterey	2,600 00	1,300 00
Mount Washington	1,550 00	1,525 00
New Marlborough	4,250 00	4,250 00
Otis	2,800 00	840 00
Peru	1,800 00	900 00
Richmond	1,800 00	1,800 00
Sandisfield	4,350 00	1,305 00
Savoy	2,800 00	700 00
Sheffield	4,850 00	5,850 00
Tyringham	1,250 00	1,250 00
Washington	3,000 00	1,750 00
West Stockbridge	1,900 00	2,850 00
Windsor	3,300 00	990 00
Bristol County:		
Berkley	2,400 00	2,400 00
Freetown	3,150 00	4,725 00
Norton	2,850 00	5,700 00
Raynham	2,200 00	4,400 00
Rehoboth	6,550 00	8,050 00
Essex County:		
Boxford	3,500 00	5,750 00
West Newbury	1,950 00	2,925 00
Franklin County:		
Ashfield	5,100 00	4,280 00
Bernardston	2,050 00	2,050 00
Charlemont	2,500 00	2,500 00
Colrain	5,750 00	5,750 00
Conway	4,700 00	3,960 00
Hawley	2,450 00	735 00
Heath	2,700 00	810 00
Leverett	2,400 00	2,020 00
Leyden	2,050 00	615 00
Monroe	900 00	1,350 00
New Salem	3,200 00	1,600 00
Northfield	3,550 00	5,325 00
Rowe	2,050 00	615 00
Shutesbury	2,200 00	1,200 00
Sunderland	1,700 00	2,550 00
Warwick	3,600 00	2,220 00
Whately	2,050 00	3,075 00

COUNTIES AND TOWNS.	ALLOTMENTS.	
	State.	Town.
Hampden County:		
Blandford	\$5,900 00	\$5,570 00
Brimfield	3,200 00	2,560 00
Chester	4,450 00	4,850 00
Granville	3,750 00	1,875 00
Hampden	2,200 00	1,860 00
Holland	1,550 00	465 00
Monson	5,650 00	5,650 00
Montgomery	2,100 00	2,000 00
Southwick	4,775 00	4,775 00
Tolland	2,900 00	930 00
Wales	1,200 00	1,200 00
Hampshire County:		
Belchertown	7,600 00	9,680 00
Chesterfield	2,650 00	1,325 00
Cummington	2,650 00	1,325 00
Enfield	1,850 00	2,775 00
Goshen	1,850 00	1,240 00
Granby	3,300 00	3,300 00
Greenwich	2,450 00	2,060 00
Huntington	2,350 00	3,725 00
Middlefield	1,800 00	900 00
Pelham	2,000 00	1,600 00
Plainfield	2,400 00	720 00
Prescott	2,150 00	785 00
Southampton	3,850 00	3,140 00
Westhampton	2,200 00	660 00
Williamsburg	2,100 00	3,150 00
Worthington	3,550 00	1,065 00
Middlesex County:		
Acton	3,450 00	6,900 00
Ashby	2,850 00	2,850 00
Ashland	538 00	1,350 00
Boxborough	1,300 00	1,040 00
Carlisle	3,000 00	1,500 00
Dunstable	1,750 00	1,400 00
Holliston	3,675 00	7,350 00
Hopkinton	2,300 00	4,500 00
Littleton	2,100 00	4,200 00
Sherborn	3,500 00	7,000 00
Stow	2,250 00	4,500 00
Townsend	3,200 00	6,400 00
Tyngsborough	1,700 00	2,550 00
Wilmington	2,200 00	6,600 00
Norfolk County:		
Bellingham	2,050 00	5,125 00
Medway	3,675 00	8,575 00
Norfolk	2,250 00	4,500 00
Plymouth County:		
Halifax	1,600 00	2,400 00
Lakeville	3,600 00	2,400 00
Plympton	1,700 00	1,700 00
Rochester	2,400 00	3,600 00
Worcester County:		
Ashburnham	3,700 00	3,700 00
Berlin	1,950 00	2,925 00
Bolton	3,100 00	3,600 00
Boylston	1,950 00	1,950 00
Brookfield	1,800 00	3,600 00
Charlton	5,850 00	4,560 00
Dana	2,900 00	3,160 00
Douglas	3,450 00	5,175 00
Harvard	2,800 00	5,600 00
Holden	3,850 00	7,700 00
Hubbardston	3,800 00	3,040 00
Lunenburg	3,250 00	4,875 00
Mendon	2,400 00	3,850 00
New Braintree	2,450 00	1,960 00
Northborough	2,750 00	5,500 00
Oakham	2,250 00	1,125 00
Oxford	400 00	435 00
Paxton	1,450 00	1,450 00

COUNTIES AND TOWNS.	ALLOTMENTS.	
	State.	Town.
Worcester County— <i>Con.</i>		
Petersham	\$3,500 00	\$3,500 00
Phillipston	2,050 00	1,025 00
Princeton	4,100 00	4,600 00
Royalston	3,350 00	3,350 00
Rutland	3,550 00	3,550 00
Sterling	3,650 00	5,475 00
Sturbridge	3,950 00	3,950 00
Sutton	800 00	1,200 00
Templeton	3,400 00	6,800 00
Upton	2,950 00	4,425 00
West Brookfield	4,000 00	3,500 00
Westminster	3,850 00	3,850 00

The expenditures during 1922 in various counties were:—

COUNTY.	Amount.
Barnstable	\$7,762 08
Berkshire	58,229 15
Bristol	19,568 45
Essex	3,570 00
Franklin	51,324 32
Hampden	36,010 93
Hampshire	43,667 90
Middlesex	37,251 20
Norfolk	10,142 15
Plymouth	8,739 72
Worcester	91,669 94

Details of the foregoing expenditures follow:—

Barnstable County.

Eastham	\$3,200 00
Truro	3,676 15
Wellfleet	885 93

Berkshire County.

Alford	1,400 00
Becket	2,033 01
Cheshire	4,050 00
Egremont	1,318 34
Florida	2,100 00
Hancock	2,389 01
Hinsdale	2,712 10
Lanesborough	2,609 42
Monterey	2,222 66
Mount Washington	1,457 21
New Marlborough	5,556 60
Otis	2,392 79
Peru	2,510 83

Richmond	\$2,700 00
Sandisfield	4,497 39
Savoy	2,840 05
Sheffield	5,346 75
Tyringham	1,788 99
Washington	2,394 29
West Stockbridge	2,680 48
Windsor	3,229 23

Bristol County.

Berkley	2,400 00
Freetown	3,150 00
Norton	3,370 18
Raynham	4,298 27
Rehoboth	6,350 00

Essex County.

Boxford	3,120 00
West Newbury	450 00

Franklin County.

Ashfield	5,087 88
Bernardston	2,015 27
Charlemont	2,425 00
Colrain	5,523 87
Conway	4,550 00
Hawley	2,469 87
Heath	2,700 00
Leverett	2,624 43
Leyden	2,050 00
Monroe	1,350 00
New Salem	4,900 00
Northfield	3,940 18
Rowe	2,050 00
Shutesbury	2,271 25
Sunderland	1,598 20
Warwick	3,625 00
Wendell	75 00
Whately	2,068 37

Hampden County.

Blandford	5,678 55
Brimfield	3,978 34
Chester	3,921 94
Granville	4,073 52
Hampden	2,214 54
Holland	1,551 85

Monson	\$4,756 63
Montgomery	1,623 27
Southwick	4,398 50
Tolland	2,747 68
Wales	1,066 11

Hampshire County.

Belchertown	6,915 69
Chesterfield	2,451 70
Cummington	2,650 00
Enfield	1,875 00
Goshen	1,600 00
Granby	3,400 00
Greenwich	1,925 00
Huntington	2,093 33
Middlefield	1,850 00
Pelham	2,000 00
Plainfield	2,400 00
Prescott	2,150 00
Southampton	3,700 00
Ware	359 11
Westhampton	1,550 00
Williamsburg	2,150 00
Worthington	4,598 07

Middlesex County.

Acton	3,315 91
Ashby	3,843 56
Ashland	500 00
Boxborough	1,272 44
Carlisle	2,977 30
Dunstable	2,211 67
Holliston	3,835 00
Hopkinton	1,806 55
Littleton	2,100 00
Sherborn	3,616 06
Stow	3,534 64
Townsend	3,507 64
Tyngsborough	1,587 71
Wilmington	3,342 72

Norfolk County.

Bellingham	3,092 15
Medway	3,675 00
Norfolk	3,375 00

Plymouth County.

Halifax	\$1,600 00
Lakeville	4,553 67
Rochester	2,586 05

Worcester County.

Ashburnham	3,670 46
Berlin	2,035 38
Bolton	3,712 63
Boylston	2,264 40
Brookfield	2,183 28
Charlton	5,513 21
Dana	3,297 82
Douglas	2,949 92
Harvard	2,800 00
Holden	4,296 64
Hubbardston	3,589 92
Lunenburg	3,327 19
Mendon	2,240 31
New Braintree	3,103 09
Northborough	1,626 90
Oakham	2,329 91
Oxford	400 00
Paxton	1,244 73
Petersham	5,669 98
Phillipston	2,123 96
Princeton	4,337 59
Royalston	3,653 19
Rutland	2,987 59
Sterling	3,657 55
Sturbridge	3,843 29
Sutton	1,238 19
Templeton	2,776 05
Upton	3,038 46
West Brookfield	3,712 90
Westminster	4,045 40

 \$367,935 84

Engineering	133,603 13
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 Total \$501,538 97

STATE AID IN KEEPING CERTAIN HIGHWAYS OPEN DURING THE WINTER MONTHS.

(Section 11, chapter 84, General Laws.)

Section 11, chapter 84 of the General Laws, provides —

The department of public works may, by furnishing such equipment as it deems desirable and supervising the use of the same, co-operate with the proper officers of cities and towns in keeping open and reasonably passable for vehicles during the winter months such highways as may be selected by said department, with the approval of the proper officers of the city or town in which any such highway is located, having regard to the importance thereof for commercial uses and the co-operation and aid to be rendered by cities, towns and persons in carrying on this work, and for this purpose may accept financial or other assistance from any person; provided, however, that work carried on under this section shall be supplemental to work undertaken and performed by cities and towns under other provisions of law, and that nothing in this section shall render the commonwealth liable for damages for which it is not liable under other provisions of law or relieve cities and towns from keeping their highways clear from ice and snow as required by other provisions of law.

Snow fences were erected during the winter months along the Boston-Springfield, Boston-Lawrence, Springfield-Greenfield, Greenfield-Pittsfield, Pittsfield-North Adams and Pittsfield-Springfield lines of highway, the total length of fences being approximately 15,000 feet.

The Department also furnished certain equipment in accordance with the provisions of section 11 aforesaid.

The expenditure during the year ending Nov. 30, 1922, was \$43,420.15.

THE REGULATION OF ADVERTISING SIGNS AND DEVICES
WITHIN THE PUBLIC VIEW.(Sections 29 to 33, ¹ chapter 93, General Laws.)

Legislation. — By the provision of chapter 545 of the Acts of 1920, approved May 27, 1920, and later consolidated in the General Laws, chapter 93, sections 29 to 33, inclusive, the Division of Highways of the Department of Public Works was directed, within sixty days after the passage of the act, to

make rules and regulations for the proper control and restriction of billboards and other advertising devices on public ways or on private property within public view of any highway, public park or reservation, and authorized, from time to time, to amend, repeal or add to said rules and regulations.

Rules and Regulations. — Revised rules and regulations adopted June 29, 1921, to be in force on and after July 1, 1921, were printed in the annual report of the Department of Public Works for 1921, and are still in force.

Administration — Inspection. — The administration of this law was commenced April 1, 1921, with a chief inspector and one assistant inspector. During 1922 an additional assistant inspector was appointed, the duties of these inspectors to include the examination of locations for billboards and other advertising devices for which applications are made to the Division for permits.

Applications, Licenses and Permits. — During 1922 individuals, firms and corporations to the number of 50 took out applications and received licenses to conduct the business of outdoor advertising within the State. Applications for permits were received from all of these individuals, firms and corporations, also from 59 individuals who were not in the business of outdoor advertising, but only advertising the business which they themselves were carrying on.

The total number of applications for permits received from April 1, 1921, to Nov. 30, 1922, was 11,382. The number of applications received between Dec. 1, 1921, and Nov. 30, 1922, was 1,817, and of this number 1,178 applications were for new locations. On these new applications 758 permits were granted for the erection of advertising signs, and approximately 75 per cent of these permits were for small signs having an area of less than 60 square feet. The remainder of these new applications were either held up on account of hearings, ordinances or by-laws, or have been disapproved.

The total number of permits granted for the maintenance of outdoor advertising signs from April 1, 1921, to Nov. 30, 1922, was 4,741, and the number granted between Dec. 1, 1921, and Nov. 30, 1922, was 3,895.

The total number of permits which were canceled by the advertisers to Nov. 30, 1922, was 232.

The total number of locations which were lost and on which no permits had been granted was 251.

The total number of permits in good standing Nov. 30, 1922, was 4,509.

Permits numbering 2,601 were renewed on Oct. 1, 1922, to expire July 1, 1923.

Forty-seven special permits were granted to circuses and agricultural fairs for the placing of banners, cards, etc., under section 4D of the rules and regulations aforesaid.

Six applications for permits were disapproved by the Division.

Billboards, Advertising Signs. — A number of billboards have been relocated, reduced in size or removed in various cities and towns on account of being located at dangerous corners, on complaints of abutters, and for other reasons.

At the request of the Division, 23 advertising signs have been removed by the owners for various reasons, 10 of these being located along the Mohawk Trail, which has been set aside as a scenic highway.

The Division has removed 54 advertising signs in various parts of the State, which had been discontinued by the advertisers or owners of the boards. In all cases where signs were removed permission was obtained from the owners of the property after having received information from the owners of the boards that they did not care to use them any longer.

Ordinances and By-Laws. — Ordinances and by-laws to the number of 17 have been submitted by the following cities and towns for approval: —

Arlington.	Hingham.	Springfield.
Dartmouth.	Milton.	Watertown.
Dedham.	Natick.	Westfield.
Framingham.	Newton.	Winchester.
Great Barrington.	Quincy.	Winthrop.
Groton.	Sharon.	

Of the ordinances submitted, that by the city of Newton was approved by the Division on Jan. 24, 1922. The ordinance submitted by the city of Springfield was disapproved July 6, 1922. The ordinance of the city of Westfield was returned, not approved, on Aug. 1, 1922. The remainder were held for further consideration.

During the year, hearings were held in October, 1921, and in February, March, June and August of 1922, on objections from the following cities and towns to certain locations, under section 3D of the rules and regulations aforesaid: —

Agawam.	Hanover.	Rockport.
Amesbury.	Haverhill.	Rutland.
Andover.	Hingham.	Salem.
Arlington.	Holbrook.	Saugus.
Attleboro.	Holyoke.	Somerset.
Barnstable.	Hull.	Somerville.
Barre.	Kingston.	South Hadley.
Bedford.	Lexington.	Southborough.
Beverly.	Lincoln.	Stoneham.
Brockton.	Lynnfield.	Swampscott.
Brookfield.	Marblehead.	Taunton.
Chelmsford.	Marlborough.	Tewksbury.
Chelsea.	Medfield.	Tyngsborough.
Clinton.	Medford.	Wakefield.
Concord.	Merrimac.	Walpole.
Danvers.	Middleborough.	Waltham.
Dedham.	Milford.	Wareham.
Dudley.	Milton.	Watertown.
East Bridgewater.	Natick.	West Newbury.
East Longmeadow.	Needham.	West Springfield.
Falmouth.	Newton.	Westfield.
Fitchburg.	Northampton.	Weston.
Foxborough.	Palmer.	Westport.
Framingham.	Pembroke.	Weymouth.
Franklin.	Plainville.	Whitman.
Gloucester.	Plymouth.	Winchester.
Grafton.	Quincy.	Woburn.
Great Barrington.	Raynham.	Wrentham.
Greenfield.	Reading.	Yarmouth.
Groton.	Rockland.	

Scenic Highways. — In addition to the three scenic highways approved in 1921, known as the Mohawk Trail route, North Shore route, and Northampton-Pittsfield route, the following route was designated and approved: —

Pittsfield-New Lebanon Route, beginning at the intersection of the State highway in Pittsfield, locally called Lebanon Road, and the road to Richmond, and extending in a westerly direction through Pittsfield and Hancock to the New York State line, between Hancock in Massachusetts and New Lebanon in New York.

The receipts for the year ending Nov. 30, 1922, were \$13,896.93.

The expenditures for the year ending Nov. 30, 1922, were \$11,272.62.

RECOMMENDATIONS FOR LEGISLATION.

DIVISION OF HIGHWAYS.

Bridges.

In the opinion of the Department of Public Works it is necessary and desirable, in the interest of public safety, that legislation be enacted which shall provide that no bridge on a public highway having a span in excess of 10 feet shall be constructed or reconstructed by any city or town except in accordance with plans and specifications therefor approved by the Division of Highways of the Department of Public Works; that said Division shall determine the maximum load that any such bridge may safely carry; and that said Division or the local authorities may maintain certain notices at each end of said bridge stating the maximum weight of vehicle with load which the bridge will carry.

Amendment of the Eight-Hour Law.

In view of the fact that public highway work is largely of a seasonal nature, and that the interests of the State and the general public would be best served by amending the eight-hour law, so called, it is recommended that section 36 of chapter 149 of the General Laws be amended by adding at the end of the second section the words, — “or to persons employed by the state department of public works or by contractors or subcontractors for said department in the construction or maintenance of highways, when, in the opinion of the commissioner of labor and industries, public necessity so requires.”

Contracts for the Construction of New State Highways or the Reconstruction of Existing State Highways.

It is recommended that legislation be passed amending section 27 of chapter 29 of the General Laws to enable the

Division of Highways, in anticipation of an appropriation, to make contracts for the construction of new State highways or the reconstruction of existing State highways.

Sale of Maps.

The Department of Public Works from time to time prepares maps for use in connection with the exercise of its powers and duties. Inasmuch as some of these maps are in considerable demand by the public, it is recommended that legislation be enacted authorizing the Department (Division of Highways and Division of Waterways and Public Lands) to sell the same at such prices and on such conditions as it may prescribe.

REGISTRY OF MOTOR VEHICLES.

It is recommended that chapter 90 of the General Laws relating to motor vehicles be amended. The various amendments may be summarized as applying to sections 1, 5, 8, 10, 12, 13, 14, 17, 22, 29, 30, 32 and 33 of said chapter, and cover the following matters: increase in fees to be paid by dealers and repairers; duplicates of licenses and plates; certified copies of applications and notices, and also to the matter of discontinuing the issuance of special licenses to chauffeurs.

DIVISION OF WATERWAYS AND PUBLIC LANDS.

Sale of Maps.

See recommendations relating to the Division of Highways.

Town Boundary Lines.

A number of inquiries have been made during the last few years as to the procedure necessary to make changes in the marking of town boundary lines when existing monuments interfered with proper and reasonable use of the premises where said marks or bounds were located.

By chapter 42 of the General Laws provision has been made in the case of lines established by the Legislature on the recommendation of the Division of Waterways and Public Lands for the preservation and remarking of such lines, but no provision has been made for other town lines.

Recommendation is therefore made that section 10 of said chapter 42 be amended.

APPENDIX.

CONTRACT PRICES DEC. 1, 1921, TO NOV. 30, 1922.

TOWN OR CITY.	Contractor.	EXCAVATION.			Plain Concrete Masonry (Cubic Yard).	BITUMINOUS SURFACING.		Concrete Surfacing (Cubic Yard).	Broken Stone (Ton).
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).		Asphalt (Gallon).	Tar (Gallon).		
Acton . . .	Canedy Construction Company.	\$1 10	-	\$5 00	\$30 00	\$0 15	-	-	\$3 50
Amesbury . . .	J. E. Watkins . . .	1 05	\$1 05	3 50	20 00	13½	-	-	3 49
Andover . . .	M. McDonough Com- pany.	90	-	5 00	-	-	-	\$10 25	-
Ashby . . .	Paul J. Keating . . .	1 25	1 25	3 50	20 00	-	-	-	-
Ashburnham . . .	Lane Construction Cor- poration.	1 25	1 25	4 00	20 00	14	-	-	4 00
Ashland . . .	John L. Schube . . .	1 25	1 50	3 00	-	15	-	-	3 80
Ayer-Shirley . . .	Canedy Construction Company.	1 10	1 25	5 00	30 00	15	-	-	3 50
Becket (bridges) . . .	Frizzell Engineering Com- pany.	1 20	1 10	-	25 00	20	-	-	-
Bridgewater, Middle- borough.	Bertram L. Thomas . . .	-	-	5 00	17 50	-	-	-	-
Burlington . . .	A. J. Mitchell, Inc. . .	1 20	1 00	5 00	20 00	11	-	-	-
Cummington-Goshen . . .	T. J. Quinn . . .	1 40	1 48	3 00	25 00	16	-	-	4 35
Danvers . . .	Canton Engineering Com- pany.	1 40	1 25	4 00	18 00	14	-	-	2 30
Dover-Needham . . .	W. H. Connor & Son . .	1 25	1 50	2 00	-	17	-	-	3 50
Easton-Raynham . . .	C. Bianchi & Co. . .	1 15	1 10	5 00	20 00	16	-	11 00	3 90
Enfield . . .	-	-	-	-	-	-	-	-	-
Essex . . .	L. Luchini & Son . . .	1 15	-	3 50	22 00	15	-	-	3 60
Falmouth . . .	Atwood-Thomas Con- struction Co.	1 00	80	1 50	17 50	20	-	-	4 25
Foxborough . . .	A. J. Mitchell . . .	1 10	-	3 00	-	15	-	-	3 25
Framingham . . .	Carlo Bianchi & Co. . .	1 50	-	7 00	-	16	-	-	3 00
Grafton . . .	Middlesex Construction Company.	1 35	1 40	5 00	25 00	20	-	-	4 00
Great Barrington . . .	Lane Construction Cor- poration.	1 15	1 25	3 00	30 00	14	-	-	3 50
Harwich . . .	-	-	-	-	-	-	-	-	-
Hingham . . .	Charles M. Callahan . .	90	1 16	3 00	20 00	16	-	11 00	2 50
Holbrook . . .	E. C. Sargent . . .	1 10	-	4 00	18 00	15	-	-	3 00
Holden . . .	McCabe & Giovannini . .	1 20	1 30	5 00	25 00	15	-	-	4 50
Holyoke . . .	D. O'Connell's Sons Com- pany.	1 25	1 15	4 00	20 00	15	-	-	3 25
Lee . . .	C. E. Horne . . .	1 00	-	3 00	20 00	-	-	11 00	4 00

APPENDIX.

CONTRACT PRICES DEC. 1, 1921, TO NOV. 30, 1922.

PIPE CULVERTS (LINEAL FOOT).							Fencing (Lineal Foot).	Stone Filling (Cubic Yard).	Bounds (Each).	Catch Basins (Each).	Reinforced Concrete Masonry (Cubic Yard).	Gravel Borrow (Cubic Yard).
CLAY.			CORRUGATED IRON.									
Ten-inch.	Twelve-inch.	Fifteen-inch.	Twelve-inch.	Fourteen-inch.	Sixteen-inch.	Eighteen-inch.						
-	\$1 75	-	-	-	-	-	\$1 00	-	-	\$100 00	-	\$1 50
-	1 49	-	-	-	-	-	65	-	-	72 50	-	1 10
-	1 50	\$1 75	-	-	-	-	-	-	-	75 00	-	1 25
-	2 25	-	-	-	-	-	70	-	-	-	-	1 80
-	1 50	-	-	-	-	-	75	\$2 25	-	100 00	-	-
-	-	-	-	-	-	-	75	-	-	-	-	1 65
-	-	-	-	-	-	-	80	-	-	100 00	-	1 50
-	-	-	-	-	\$5 00	-	1 00	-	-	-	\$25 00	1 20
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	85 00	-	1 40
-	-	-	\$4 00	-	-	\$4 60	65	2 90	\$5 00	100 00	39 00	1 85
-	-	-	-	-	-	-	60	-	-	75 00	-	1 25
-	-	-	-	-	-	-	70	-	-	-	26 00	1 75
-	1 25	1 50	-	-	-	-	75	-	6 00	75 00	30 00	1 00
-	-	-	-	-	-	-	-	-	-	-	-	-
-	1 80	2 10	-	-	-	-	75	-	-	75 00	-	1 20
\$1 25	-	-	-	-	-	-	-	-	-	75 00	22 50	1 33½
-	-	-	3 00	-	4 00	-	75	-	-	75 00	-	1 10
1 50	-	-	-	-	-	-	-	-	-	90 00	-	1 90
-	-	-	2 75	-	-	-	75	3 00	-	-	-	1 30
-	1 75	2 00	-	-	-	-	75	3 00	4 00	100 00	35 00	1 25
-	-	-	-	-	-	-	-	-	-	-	-	-
-	1 50	1 50	-	-	-	-	70	-	4 00	60 00	-	1 35
-	1 50	-	-	-	-	-	-	-	-	75 00	-	1 20
-	-	2 00	-	-	-	3 00	-	2 50	-	-	30 00	1 50
-	1 75	-	2 15	-	-	-	70	2 75	-	-	25 00	1 55
1 25	1 50	2 00	3 00	-	-	5 00	65	-	3 00	70 00	30 00	1 17

CONTRACT PRICES DEC. 1, 1921, TO NOV. 30, 1922 — *Concluded.*

TOWN OR CITY.	Contractor.	EXCAVATION.			Plain Concrete Masonry (Cubic Yard).	BITUMINOUS SURFACING.		Concrete Surfacing (Cubic Yard).	Broken Stone (Ton).
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).		Asphalt (Gallon).	Tar (Gallon).		
Leicester . . .	Bruno & Pettitti . . .	\$1 15	-	\$3 00	\$25 00	\$0 15	-	\$11 00	\$3 50
Lexington . . .	J. W. O'Connell . . .	1 25	-	3 00	15 00	14	-	-	2 50
Longmeadow . . .	Lane Construction Cor- poration.	1 00	-	-	-	-	-	10 90	3 00
Lowell . . .	Powers Brothers . . .	1 00	\$0 80	4 00	20 00	14½	-	-	3 50
Maynard . . .	W. H. Connor & Son . . .	-	1 50	3 00	10 00	-	-	-	-
Mendon . . .	L. C. Carchia Company	1 10	1 10	3 00	15 00	15	-	-	4 00
Merrimac, Haverhill .	Rowe Contracting Com- pany.	1 25	1 20	4 00	20 00	-	-	12 00	-
Middleton . . .	J. E. Watkins . . .	1 15	-	4 50	20 00	15	-	-	3 10
Middleton (bridge)	Engineering Service and Construction Company.	1 50	1 50	3 00	-	20	-	-	4 50
Milford . . .	L. Luchini & Son . . .	1 00	-	3 00	18 00	16	-	-	4 15
New Braintree . . .	J. Laurenzi & Russo Com- pany.	1 30	1 50	2 50	25 00	17	-	-	4 25
Northborough-West- borough.	Middlesex Construction Company.	1 30	1 60	3 50	20 00	15	-	-	3 85
Norwell . . .	Bradford Weston . . .	1 00	1 00	4 50	16 50	15½	-	-	2 60
Otis, Monterey . . .	Middlesex Construction Company.	1 60	1 50	5 00	23 00	-	-	-	-
Otis, Sandisfield . . .	Lane Construction Cor- poration.	1 10	1 25	3 25	25 00	17	-	-	3 25
Plymouth (bridge)	D. H. Jacobs & Son, Inc.	80	80	3 00	-	16	-	-	4 00
Shelburne . . .	T. J. Quinn . . .	75	1 10	3 00	18 00	14	-	-	3 95
Southwick . . .	Cenedella & Co. . .	1 00	1 00	3 00	20 00	14	-	-	2 70
Sterling, West Boylston	State Contracting Com- pany.	1 35	1 35	3 50	18 00	15	-	-	3 75
Sutton . . .	Powers Brothers . . .	1 10	1 00	3 00	20 00	-	-	11 75	-
Topsfield, Ipswich, Rowley, Newbury.	Coleman Brothers . . .	1 25	1 00	4 00	17 00	16	-	13 00	2 50
West Springfield . . .	Hassam Paving Company	1 35	-	-	-	15	-	10 26	3 00
Westwood . . .	W. A. Jones . . .	1 10	-	5 00	15 00	15	-	-	3 50
Wilbraham, Palmer, Monson.	D'Onfro Brothers, Inc. .	80	-	3 00	20 00	-	-	10 40	-
Williamstown, New Ash- ford.	Hoyt Construction Com- pany.	1 00	1 00	2 50	21 00	16½	-	-	3 00
Windsor-Cumington	Hanscom Construction Company.	1 30	1 00	5 00	20 00	17	-	-	3 50
Windsor-Dalton . . .	Lane Construction Cor- poration.	1 15	1 25	3 00	25 00	15	-	-	3 75
Woburn . . .	American Construction Company.	-	-	4 00	-	-	-	-	-
Wrentham . . .	L. Luchini & Son . . .	1 50	-	5 00	-	16	-	-	4 00
Yarmouth . . .	Atwood-Thomas Con- struction Co.	90	1 15	2 00	20 00	15½	-	-	3 65

CONTRACT PRICES DEC. 1, 1921, TO NOV. 30, 1922 — *Concluded.*

PIPE CULVERTS (LINEAL FOOT).							Fencing (Lineal Foot).	Stone Filling (Cubic Yard).	Bounds (Each).	Catch Basins (Each).	Reinforced Concrete Masonry (Cubic Yard).	Gravel Borrow (Cubic Yard).
CLAY.			CORRUGATED IRON.									
Ten-inch.	Twelve-inch.	Fifteen-inch.	Twelve-inch.	Fourteen-inch.	Sixteen-inch.	Eighteen-inch.						
\$1 50	\$2 00	-	\$3 00	-	-	-	\$0 75	\$2 50	\$4 00	\$70 00	\$30 00	\$2 00
-	1 50	-	-	-	-	-	60	-	-	75 00	18 00	1 15
-	1 25	-	-	-	-	-	-	-	-	85 00	-	50
1 50	1 50	-	3 00	-	-	-	70	-	5 00	75 00	30 00	90
-	-	-	-	-	-	-	70	-	-	-	25 00	2 00
-	2 00	\$3 00	3 00	-	\$4 25	-	1 00	2 50	6 00	60 00	25 00	1 10
-	1 50	1 65	2 60	\$3 25	3 50	\$4 00	65	-	5 00	65 00	30 00	1 15
-	1 30	-	-	-	-	-	75	-	-	75 00	-	1 14
-	-	-	-	-	-	-	1 00	-	-	-	33 00	1 50
-	-	-	1 75	-	-	-	75	2 40	-	-	25 00	1 25
-	-	-	2 50	-	-	3 00	-	2 25	-	-	-	2 50
-	-	-	3 50	-	-	4 50	-	2 90	-	-	-	1 50
-	-	-	1 48	-	-	2 05	65	-	-	64 00	-	-
-	1 75	-	3 50	-	-	5 00	-	3 20	-	-	35 00	2 00
-	2 00	-	3 00	-	-	-	70	2 25	5 00	-	35 00	1 25
-	-	-	-	-	-	-	60	-	5 00	-	24 00	1 50
-	-	-	-	-	-	-	75	2 85	4 00	85 00	26 50	1 50
1 25	2 00	-	2 00	-	-	3 50	1 50	2 35	5 00	90 00	25 00	1 60
-	-	-	-	-	-	-	75	2 20	5 00	70 00	-	1 35
-	-	-	3 00	-	-	-	-	-	-	-	30 00	1 25
-	1 50	2 00	-	-	-	-	70	-	5 00	90 00	20 00	1 20
2 25	-	-	-	-	-	-	1 00	-	-	75 00	-	1 50
-	-	-	-	-	-	-	70	-	-	-	-	1 00
-	3 00	-	-	-	-	-	-	1 75	5 00	75 00	20 00	1 25
-	1 75	-	3 00	-	-	-	60	2 35	4 00	-	25 00	1 50
-	2 00	-	3 35	-	-	4 50	60	2 60	5 00	-	35 00	1 25
-	1 50	2 00	3 00	-	-	5 00	75	3 00	4 00	100 00	30 00	1 25
-	-	-	-	-	-	-	-	-	-	-	-	1 75
-	2 50	-	-	-	-	-	-	-	-	80 00	-	1 50
-	1 50	-	1 50	-	-	-	60	-	-	60 00	-	-

FEDERAL AID.¹

AN ACT MAKING APPROPRIATIONS FOR THE POST OFFICE DEPARTMENT FOR THE FISCAL YEAR ENDING JUNE 30, 1923, AND FOR OTHER PURPOSES.

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SEC. 4. That for the purpose of carrying out the provisions of the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," approved June 11, 1916, and all Acts amendatory thereof and supplementary thereto, there is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the following additional sums, all such sums to be expended in accordance with the provisions of such Act:

The sum of \$50,000,000 for the fiscal year ending June 30, 1923.

The sum of \$65,000,000 for the fiscal year ending June 30, 1924.

The sum of \$75,000,000 for the fiscal year ending June 30, 1925.

The Secretary of Agriculture is hereby authorized, immediately upon the passage of this Act, to apportion the \$50,000,000 herein authorized to be appropriated for the fiscal year ending June 30, 1923, among the several States as provided in section 21 of the Federal Highway Act approved November 9, 1921: Provided, That the Secretary of Agriculture shall act upon projects submitted to him under his apportionment of this authorization and his approval of any such project shall be deemed a contractual obligation of the Federal Government for the payment of its proportional contribution thereto.

.

PAR. 3. For the purposes of this section and of the Acts heretofore making appropriations to aid the States in the construction of rural post roads the term "bridges" includes railroad grade, whether by means of overhead or underpass crossings.

PAR. 4. The provision of section 5 of the Act entitled "An Act making appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes," approved February 28, 1919, fixing the limitation of \$20,000 per mile which the Secretary of Agriculture may make, is hereby amended to read as follows:

"That the payments which the Secretary of Agriculture may make from sums appropriated under this Act or any Act amendatory thereof or supplementary thereto for the fiscal year ending June 30, 1923, shall not exceed \$16,250 per mile exclusive of the cost of bridges of more than twenty feet of clear span; and that the payments which the Secretary of Agriculture may make from any sums appropriated under the provisions

¹ See page 37 of this report.

of this Act or any Act amendatory thereof or supplementary thereto, after the fiscal year ending June 30, 1923, shall not exceed \$15,000 per mile exclusive of the cost of bridges of more than twenty feet of clear span: Provided, That the limitation of payments herein provided shall apply to the public-land States, except that the same is hereby increased in proportion to the increased percentage of Federal aid authorized by section 11 of the Act entitled 'An Act to amend the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes,"' approved November 9, 1921."

PAR. 5. Section 24 of the Act entitled "An Act to amend the Act entitled 'An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes,' " approved November 9, 1921, is amended to read as follows: "That in any State where the existing constitution or laws will not permit the State to provide revenues for the construction, reconstruction, or maintenance of highways, the Secretary of Agriculture shall continue to approve projects for said State until five years after November 9, 1921, if he shall find that said State has complied with the provisions of this Act in so far as its existing constitution and laws will permit."

PAR. 6. If any officer, agent, or employee of the United States, or any officer, agent, or employee of any State or Territory, or any person, association, firm, or corporation or any officer or agent of any person, association, firm, or corporation shall knowingly make any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the costs thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction of any project submitted for approval to the Secretary of Agriculture under the provisions of the Federal Highway Act, or shall knowingly make any false statement, false representation, or false report or claim for work or materials for the construction of any project approved by the Secretary of Agriculture under said Federal Highway Act and all amendments thereto, or shall knowingly make any false statement or false representation in any report required to be made under said Federal Highway Act or Acts supplementary thereto with the intent to defraud the United States shall, upon conviction thereof, be punished by imprisonment not to exceed five years or by a fine not to exceed \$10,000, or by both fine and imprisonment within said limits.

PAR. 7. If any provision of this section, or the application thereof to any person or circumstances, shall be held invalid, the validity of the remainder of the section and the application of such provision to other persons or circumstances shall not be affected thereby.

PAR. 8. All Acts or parts of Acts in any way inconsistent with the provisions of this section are hereby repealed.

REGISTRY OF MOTOR VEHICLES.

MOTOR VEHICLE DEATHS, INJURIES, COLLISIONS.

During the year 1922 the several campaigns which were started in 1920 to reduce automobile accidents and to make the highways of the Commonwealth safer for all who use them have been continued with unabated vigor. The principal agencies used to this end have been the police departments throughout the Commonwealth, the schools, the Massachusetts Safety Council, and the press. All these agencies have given us very gratifying co-operation, and have brought about a remarkable reduction in the number of persons killed, considering the fact that during the past year we had an increase of 88,753 in the registrations of motor vehicles, or a total of 461,543 registrations for the year. Two other elements which should not be overlooked as contributing causes in the reduction of accidents are: first, the regulation made in December, 1920, requiring the examination of all applicants for licenses; second, a more strict enforcement of the motor vehicle law, which resulted, during the past year, in the revocation of 8,369 licenses as compared with 4,899 taken away in the year 1921.

During the past year there has been an increase, comparatively slight, in the number of persons injured, or 15,277 as against 11,486 for 1921. This increase, however, is not surprising, in view of the greatly increased number of motor vehicles on the road. This increase in the number of injured may also be due, in part, to the fact that the public, now amply provided with a convenient accident report blank, are reporting minor accidents more than formerly. It is much to be regretted that our figures show a continued, steady increase in the number of children killed and injured. Active measures, however, will be taken during the coming year toward reducing these casualties among children.

The following comparative tables show the reduction in serious accidents that has been made during the past year, an analysis of licenses revoked and suspended, and the statistics relating to aircraft. Special attention is called to the ratio of deaths to registrations for the year 1922, indicated in one of the tables, which ratio (.00113) is smaller than that of any year in the history of this Department since 1908.

NUMBER OF PERSONS KILLED AND INJURED.

	KILLED.		INJURED.	
	1921.	1922.	1921.	1922.
Pedestrians, by autos	339	302	6,484	8,986
Pedestrians, by motor cycles	2	1	40	28
Pedestrians near street cars	2	8	28	11
Occupants of autos	159	157	3,744	5,202
Occupants of motor cycles	28	22	424	304
Bicycle riders	14	19	594	425
Occupants of teams, carriages, etc.	—	2	173	183
Coasters	—	11	—	138
Totals	544	522	11,487	15,277

NUMBER OF CHILDREN KILLED AND INJURED.

	KILLED.		INJURED.	
	1921.	1922.	1921.	1922.
Boys	139	149	2,446	3,451
Girls	57	60	987	1,163
Totals	196	209	3,433	4,614

NUMBER OF COLLISIONS.

	1921.	1922.
Autos v. pedestrians	6,896	8,547
Autos v. autos	12,508	12,630
Autos v. teams, carriages, etc.	743	463
Autos v. bicycles	793	491
Autos v. trolley cars	783	466
Autos v. poles, trees, etc.	1,631	1,356
Autos v. trains	64	56
Autos v. motor cycles	725	404
Autos v. sled	58	115
Motor cycles v. pedestrians	—	30
Totals	24,201	24,558
In the daytime	18,616	18,778
After dark	5,585	5,780
Totals	24,201	24,558

SUSPENSIONS AND REVOCATIONS FOR 1921 AND 1922.

	1921.	1922.
Licenses suspended	1,940	3,184
Licenses revoked	1,119	1,385
Rights suspended	629	1,048
Registration certificates suspended	75	23
Registration certificates revoked	565	1,661
Registration certificates and licenses suspended	36	40
Registration certificates and licenses revoked	483	916
Registration certificates revoked and rights suspended	47	96
Rights to have cars operated in Massachusetts suspended	5	16
Totals	4,899	8,369
Resulting from investigations	2,341	4,555
Resulting from court convictions	2,452	3,482
Resulting from police complaints	106	262
Resulting from judge's complaints	—	39
Resulting from constabulary complaints	—	31
Totals	4,899	8,369
Reckless and endangering	438	512
Liquor	1,412	2,108
Going away	124	207
Without authority	172	307
Improper person	541	822
Improper person, liquor	96	352
Improper operation	706	1,615
Two speeds	272	304
Three speeds	23	20
Several violations	14	—
Operating for hire on operator's licenses	10	—
Did not return licenses for restrictions	7	—
Improper equipment, miscellaneous	367	703
Improper equipment, lights	—	320
Improper equipment, brakes	—	305
Deaths	516	515
Other offences	201	279
Totals	4,899	8,369
Hearings	999	1,840

SUSPENSIONS AND REVOCATIONS FOR 1921 AND 1922 — *Concluded.*

	1921.	1922.
Court recommendations adopted:		
Liquor	215	304
Reckless and endangering	61	65
Going away	25	24
Without authority	5	4
Racing	—	1
Totals	306	398
Persons whose licenses were suspended or revoked and who had to pass an examination in order to have them returned.	733	706

COMPARATIVE STATEMENT SHOWING RATIO OF ACCIDENTS TO YEARLY REGISTRATIONS, SUSPENSIONS, ETC.

YEAR.	Auto- mobiles reg- istered.	Motor Cycles reg- istered.	Total Reg- istrations.	Number of Persons killed.	Ratio of Deaths to Reg- istrations.	Number of Persons injured.	Ratio of Injuries to Reg- istrations.	Licenses suspended.	Licenses revoked.	Rights suspended.
1908	18,066	1,922	19,988	13	.00065	486	.02431	51	44	-
1909	23,971	2,394	26,365	54	.00205	989	.03751	132	68	-
1910	31,360	3,358	34,718	77	.00222	963	.02774	198	90	-
1911	38,907	3,658	42,565	110	.00258	1,248	.02932	254	95	-
1912	50,132	5,034	55,166	142	.00257	1,962	.03557	335	190	-
1913	62,660	7,127	69,787	188	.00269	2,923	.04188	365	198	-
1914	77,246	8,161	85,407	229	.00268	4,010	.04695	521	231	34
1915	102,633	9,520	112,153	294	.00262	6,197	.05525	615	303	181
1916	136,809	10,713	147,522	315	.00214	9,131	.06190	641	514	232
1917	174,274	11,065	185,339	438	.00236	7,282	.03929	794	717	300
1918	183,497	12,862	206,359	499	.00242	8,598	.04166	957	811	398
1919	247,183	13,698	260,881	582	.00223	16,287	.06243	1,013	856	264
1920	304,631	15,143	319,774	481	.00150	21,182	.06624	1,270	1,172	346
1921	360,731	12,058	372,790	544	.00145	11,487	.03081	1,940	1,119	629
1922	449,898	11,675	461,513	522	.00113	15,277	.03310	3,184	1,385	1,048

CONFERENCE OF MOTOR VEHICLE ADMINISTRATORS.

During the year 1922 four meetings of the Conference of Motor Vehicle Administrators were held. The first meeting, January 20, held at Hartford, Conn., was attended by the registrar. The second, on April 21, at Harrisburg, Pa., was attended by the chief clerk. Massachusetts was not represented at the third meeting, on July 21, at Baltimore, Md. The fourth meeting was held on September 22 in Boston.

This conference now includes the following States: Maine, Massachusetts, New Hampshire, Vermont, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey and Maryland.

The purpose of the conference is to promote uniformity in motor vehicle legislation, and over twenty-two resolutions were considered by the conference, among the principal ones being: the right of way law; the law in regard to weight, height and speed of commercial vehicles; and the law in regard to operating under the influence of liquor; upon all of which the conference unanimously agreed. The conference also agreed to carry on safety campaigns in their respective States, and a committee has been designated to report on "uniform hand signals."

Probably the most important resolution accepted by the conference is the adoption by the States represented of what is known as "The 1922 Standard Specifications for Approval of Headlighting Devices." These specifications are based on the original Massachusetts specifications, with a few minor improvements, and have been adopted by the Illuminating Engineering Society and the Society of Automotive Engineers.

Approval of headlighting devices is given after ratification by the conference, and will result in uniform approved lists of approved headlighting devices.

INVESTIGATIONS AND PROSECUTIONS BY INSPECTORS.

The following table presents a classification and summary of the work of the inspectors other than examination work, together with comparative figures for the preceding year: —

	1921.	1922.
Total reports received from inspectors	3,360	5,091
Itemized as follows:		
Accidents, fatal	554	510
Accidents, non-fatal	385	701
Accidents, brief reports	243	498
General reputation	521	870
Miscellaneous	1,657	2,512
Totals	3,360	5,091
Complaints filed	-	13,281
Garages inspected	-	1,339
Headlight violations reported	-	12,096
Prosecutions conducted	221	405
Fines imposed	\$5,845	\$9,462

The figures above include four airplane accidents investigated, — one fatal and three non-fatal.

ANALYSIS OF COURT ABSTRACTS RECEIVED.

	1921.	1922.
Number of courts forwarding abstracts	94	95
Number of abstracts received	30,714	35,968
<i>Disposition of Cases.</i>		
Guilty	21,687	25,646
Not guilty	991	1,084
Appealed	1,391	1,588
Placed on file	7,140	6,500
Nol-prossed	737	476
Probation	365	379
Imprisonment	503	525
Defaulted	26	30
<i>Offences.</i>		
Overspeeding	7,247	4,392
Reckless	268	291
Intoxicated	1,821	2,157
Using auto without authority	286	788
Endangering lives	610	765
Not stopping after causing injury	266	408
Without license	2,746	3,237
Without registration certificate	1,551	1,894
Unregistered vehicle	325	408

ANALYSIS OF COURT ABSTRACTS RECEIVED — *Concluded.*

	1921.	1922.
<i>Offences — Concluded.</i>		
Improper display or no register number	409	457
Refusing to stop on signal	531	557
Unlighted lamps	1,681	1,424
No signal	2,738	3,563
Dazzling lights	230	331
Operating within 8 feet of street car	472	454
Violation of metropolitan park rules	664	345
Operating, license suspended or revoked	102	132
Larceny	196	179
Manslaughter	134	39
Miscellaneous	2,576	2,189

EXAMINATIONS FOR LICENSES.

Examinations of applicants for licenses to operate motor vehicles are now held at 58 examination points in the Commonwealth. At some of these points examinations are conducted daily, at other places weekly or fortnightly, depending on the season of the year, and as warranted by the number of applicants. During the fiscal year 1922 the inspectors conducted 122,220 examinations of private operators and chauffeurs. The table below gives the several classes of persons examined, and shows the number of those who were found unfit.

With regard to the personnel of this section, there have been some additions to the force, so that it now consists of the chief and 65 inspectors.

	1919.	1920.	1921.	1922.
Total examinations	19,107	39,845	94,023	122,220
Chauffeurs examined	18,882	37,444	46,506	54,541
Chauffeurs unfit	3,499	4,510	5,485	7,575
Operators examined	225	2,401	46,136	64,447
Operators unfit	66	403	9,716	12,968
Removal of restriction, examined	—	—	—	3,130
Removal of restriction, unfit	—	—	—	255
"Competency," passed	—	83	137	102
"Competency," unfit	—	45	23	17

HEADLIGHTING.

During the year very satisfactory improvement has been made in the headlighting of motor vehicles, both in the advancement of the art and in the results obtained by enforcement. Inasmuch as this is the first full year since the use of approved headlighting devices has been required, the results obtained are of considerable importance as showing the effectiveness of this law. In spite of the fact that there was an increase of 88,753 registrations over the preceding year, the fatal accidents occurring at night decreased from 183 in 1921 to 171 in 1922. In other words, there was one fatal accident at night for every 2,037 motor vehicles registered in 1921, while during the year 1922 there was only one fatal accident at night for every 2,699 motor vehicles registered.

This improvement in conditions may be attributed to three causes:—

1. An increase in the amount of light in the case of many vehicles which have heretofore had an insufficient amount.

2. A decrease in the amount of light in other cases where high candlepower bulbs were used.

3. A better control of the light within that area below the horizontal, where it is necessary for safe driving without causing glare.

In former years our yearly analysis has shown that approximately 20 per cent of the night accidents were due to lighting conditions. This 20 per cent is made up approximately as follows: 15 per cent insufficient light and 5 per cent glare.

The improvement in conditions noted under 1 and 2 has been very marked, due to a vigorous enforcement to secure proper equipment, which includes the headlighting device, the bulb and the reflector. The improvement in conditions under 3 has also been quite marked, but has not progressed so far, due to the fact that it requires an extensive educational program. This educational work has been handled by two different methods: (1) by the issuance of simple printed instructions to the car owner or operator himself; (2) by the official approval of such persons as made application and were found competent after instruction to adjust headlamps of all kinds.

The list of approved headlamp adjusters was increased during the year to about 650, in all parts of the State. This list has been kept available in printed form, and has been issued to persons requesting it, and also to persons who have been reported as violating the headlight law.

During the year 12,096 violations of the headlight law were reported by inspectors in the Department, and approximately 1,000 complaints were received from police officers and others. In most of these 13,000 cases, the owners of the vehicles were required either to remedy the defect themselves and report to an examiner at one of the examination points for inspection, or to report to an approved adjuster who would correct the defect and mail a certificate to this office.

Some improvement has been made in the laboratory tests of devices which are submitted for approval. The specifications for such tests, which were adopted by the registrar when the law went into effect, have been followed in principle by the Illuminating Engineering Society and Society of Automotive Engineers, which, at a joint meeting in New York in February, made a few slight improvements in these specifications, and adopted them. Since then the Conference of Motor Vehicle Administrators have adopted the same specifications for test, and, in the interests of uniformity, the ten motor vehicle administrators making up this conference have agreed not to approve of any headlighting device in their respective States until the conference has passed on its acceptability.

During the year 19 applications were made for approval of headlighting devices. Of these, 16 were approved and 3 were refused approval because they did not comply with the test requirements.

REAR LAMPS.

On July 27, 1922, the law went into effect requiring that no rear lamp shall be used on any motor vehicle unless approved by the registrar. Exhaustive tests were made and specifications formulated for approval of rear lamps. Temporary approval was given by the registrar to cover all lamps which complied with the old law requiring the illumination of number plates so as to be legible at 60 feet, and such temporary approval was good until Jan. 1, 1923. In the meantime applications for approval of rear lamps were received, and the first

list of approved lamps was announced on November 15. Up to the 1st of December 42 rear lamps were approved, many of them submitted by motor car manufacturers.

At a joint meeting of the Illuminating Engineering Society and Society of Automotive Engineers held on Dec. 29, 1922, the specifications under which rear lamps are approved in this State were adopted in principle, although a slightly different form and wording was used. These specifications were not adopted solely as a result of the work done in Massachusetts, but also as a result of exhaustive tests by the committee members working independently. Approvals given under either set of specifications would be practically identical.

The principal changes in the new rear lamps have been exclusively in relation to the illumination of the number plate. The changes made are as follows:—

1. The use of glass instead of celluloid or mica in the opening through which the light passes to the number plate.

2. The requirement of a wider window opening.

3. The use of a number-plate holder in conjunction with the lamp which supports the bulb in a location farther out from the surface of the plate, so that the direct light shining back on to the plate illuminates the plate evenly and without shadow.

AIRCRAFT REGISTRATIONS.

(Chapter 90, General Laws, as amended by chapter 534 of the Acts of 1922, regulating the operation of aircraft.)

In the year 1922 there were six pilots' licenses issued. The fees received with these applications amounted to \$30, or \$5 for each license.

There were twelve airplanes registered. The fees received with these applications amounted to \$37. For the first eleven certificates the fee was \$2 each. For the twelfth certificate the fee was \$15 in accordance with the new aircraft law, which went into effect Sept. 11, 1922.

During the year the certificates of registration of two airplanes were revoked. One of these airplanes was re-registered under another number.

The name of one person, who held neither license nor certificate in this State, was placed on the blacklist.

USED CAR SECTION.

(Motor Vehicle Identification.)

This section indexes the cars reported stolen and also lists the sale of used cars. In 1922 there were 8,101 cars reported stolen to this office. This total represents cars stolen from different parts of the country.

The following cars stolen outside of this State have been recovered through information furnished by this office: 3 cars stolen in Providence, R. I., 2 in Pawtucket, R. I., 1 in Lewiston, Me., 1 in Keene, N. H., 1 in Wilmington, Del., 1 in Mt. Clemens, Mich., and 23 in New York City and suburbs.

The following cars stolen in Massachusetts have been recovered outside of the State through information furnished by this office: 1 in Danielson, Conn., 1 in Putnam, Conn., 1 in Pawtucket, R. I., 2 in Manchester, N. H., 1 in Providence, R. I., 1 in Rochester, N. H., 1 in Dover, N. H., 1 in Auburn, Me., 1 in Ludlow, Vt., 1 in Springfield, Vt., 2 in Rutland, Vt., 1 in Quebec, Can., 5 in New York City, 1 in Brooklyn, N. Y., 1 in Rouses Point, N. Y., 1 in Wymantskill, N. Y., 1 in Philadelphia, Pa., 1 in Malta Bend, Ind., 1 in San Francisco, Cal., and 1 in Worland, Wyo.

A Buick touring car registered in Indiana was stolen while the owner was visiting in this State. The car was later recovered in Massachusetts. In locating the owner of the car, we found that he changed his residence to Chicago, Ill. A Buick car, registered here, was stolen from the owner in New York and later recovered in that State through this Department. A Cadillac car stolen in New Haven, Conn., was located at Manchester, Vt., through a dealer's report received at this office. A Ford runabout sold by a party in Watervliet, N. Y., to a Boston man was located at Manchester, N. H., through a dealer's report received at this office. A Ford coupe, stolen in Syracuse, N. Y., was located at Oneonta, N. Y., through this office; the car was the property of a Boston man. A White touring car owned by a man in New Glasgow, N. S., was stored at a Boston garage. The car was stolen from said garage and later recovered in West Newton through information furnished by this office.

The following figures show the work of the section for the fiscal year 1922: —

	1921.	1922.
Dealers:		
Total number making reports to this office	1,681	1,484
Total number of first-class dealers reporting	1,033	1,112
Total number of second and third class dealers reporting	648	595
Reports:		
Approximate number of individual reports received daily	175	275
Approximate number of dealers' reports received daily	250	325
Motor vehicles stolen:		
Number of stolen motor vehicles reported to this office	7,390	8,101
Number of cars stolen in Boston	490	379
Number of cars recovered through this office	339	280
Engine numbers assigned:		
Engine numbers assigned to cars	550	459
Letters authorizing replacing of engine numbers	50	81

The following comparative statement of cars stolen in Boston during the last five years shows the salutary effect of the so-called four-day law passed in 1919: —

STOLEN CARS IN BOSTON.

	1918.	1919.	1920.	1921.	1922.
Cars stolen	866	1,063	480	490	379
Cars recovered	607	609	297	329	159
Cars not recovered	259	454	183	161	220

REGISTRATIONS, LICENSES, FEES.

Although it has seemed that motor vehicle registration must stop increasing, the year 1922 showed an increase over that of 1921 greater than the increase of 1921 over the year 1920, the percentage on pleasure or passenger vehicles being nearly 25 per cent. The following statement graphically shows increased registrations: —

AUTOMOBILES, COMMERCIAL VEHICLES AND MOTOR CYCLES.

	1905.	1910.	1915.	1920.	1921.	1922.
Automobiles	4,889	31,360	90,580	251,570	305,471	378,839
Commercial vehicles	—	—	12,053	52,968	55,261	70,999
Motor cycles	553	3,358	9,520	15,142	12,048	11,675
Totals	5,442	34,718	112,153	319,680	372,780	461,513

The fees received for the year 1922, together with the number of vehicles registered in each classification and the number of licenses granted, etc., are shown in the following table: —

ANALYSIS OF RECEIPTS.

Certificates of registration:

Passenger cars	378,839	\$3,456,397 50
Commercial cars	70,999	949,271 00
Trailers	519	8,754 00
Motor cycles	11,675	53,698 00
Motor cycle dealers	39	390 00
Manufacturers or dealers	1,742	42,937 50
Repairers' fees	366	3,630 00
Additional cars	2,995	19,385 50

Licenses to operate:

Operators	51,208 at \$2 00	102,416 00
Operators' renewals	222,482 at 2 00	444,964 00
Chauffeurs	46,818 at 2 00	93,636 00
Chauffeurs' renewals	123,665 at 2 00	247,330 00

Examinations 121,245 at 2 00 242,490 00

Copies of certificates and licenses furnished 22,486 at 50 11,243 00

Duplicate automobile number plates 8,549 at 75 6,411 75

Duplicate motor cycle number plates 116 at 50 58 00

State plates 148 at 10 14 80

Lens approval applications 15 750 00

Rear lamp approval applications 35 1,750 00

Totals 965,915 \$5,685,527 05

Other receipts (rebate checks not paid) 415 19

Total fees \$5,685,942 24

Motor vehicle fees rebated (deducted) 65,025 61

Net fees \$5,620,916 63

Court fines received by the Treasurer and Receiver-General 264,551 53

Total receipts credited motor vehicle fees account, 1922 \$5,885,468 16

The cost of running the Registry of Motor Vehicles for the year 1922 was \$648,725.90, which was 11.54 per cent of the net fees collected, as compared with 11.67 per cent for the year 1921 and 11.27 per cent for the year 1920. This cost, deducted from the receipts of the year, left available for legislative appropriation for highway work by the 1923 Legislature the sum of \$5,236,742.26.

The following statement gives an analysis of expenditures for the year by the Registry:—

EXPENDITURES FOR THE FISCAL YEAR 1922.

Personal services:

Regular pay roll	\$318,078 91	
Overtime	19,658 11	
	<hr/>	\$337,737 02

Supplies:

Books, maps, etc.	\$436 68	
Typewriter supplies	736 25	
Adding machine supplies	42 86	
Other supplies	955 04	
Stationery	8,985 80	
Typewriter repairs	1,285 65	
Other repairs	242 63	
	<hr/>	12,684 91

Equipment:

Typewriter machines	\$2,137 62	
Adding machines	696 20	
Other machines	2,024 29	
	<hr/>	4,858 11

Furniture:

Desks	\$1,421 60	
Filing cabinets	7,366 04	
Chairs	418 67	
Other articles as listed below:		
Rest and recreation rooms	657 58	
Tables	420 21	
Miscellaneous	131 39	
Electric fans	1,160 33	
	<hr/>	11,575 82

Travel:

Employees	\$25,729 25	
Automobiles (owned by employees)	54,521 58	
Other traveling expenses	2,858 97	
Motor cycle equipment	166 67	
Auto top	325 00	
		<hr/>
		\$83,601 47

Other services and expenses:

Expressage	\$420 73	
Postage	37,021 95	
Printing	29,325 44	
Other reports	3,519 58	
Telephone	2,783 82	
Premium on bonds of employees	132 50	
Rent	24,198 55	
Water and ice	872 20	
Cleaning	495 00	
Towels	589 83	
Soap	111 11	
Special services (labor and police)	2,033 10	
Other services as listed below:		
Badges for inspectors	25 00	
Clocks and regulating	217 38	
Commissions as justices of the peace	122 00	
Headlight	901 45	
Number plates	95,141 91	
Sundries	45 06	
Sign painting, etc.	311 96	
		<hr/>
		198,268 57

Total \$648,725 90

The total amount available for 1922 was \$658,056.65.

The following comparative statement for the years 1921 and 1922 shows very plainly the increase of work as occasioned by additional registrants and licensees, etc.:—

	1921.	1922.
Automobile registrations	305,471	378,839
Highest number plate assigned	259,655	321,573
Commercial registrations	55,261	71,518
Highest number plate assigned	B55,150	B65,598
Motor cycle registrations	12,048	11,675
Highest number plate assigned	11,393	10,731

	1921.	1922.
Motor cycle dealers' registrations	51	39
Manufacturers' or dealers' registrations	1,848	1,742
Additional cars (dealers)	2,848	2,995
Repairers	280	366
Licenses to operate:		
Operators	36,420	51,208
Chauffeurs	41,021	46,818
Operator renewals	211,349	222,482
Chauffeur renewals	91,729	123,665
Total licenses	380,519	444,173
Examinations	93,501	121,245
Copies of certificates and licenses issued	17,337	22,486
Duplicate automobile number plates	7,552	8,549
Duplicate motor cycle number plates	197	116
Miscellaneous applications	843	198
Total number of applications handled	800,315	965,915
Fees received	\$4,712,890 00	\$5,685,527 05
Miscellaneous receipts	920 38	415 19
Total fees	\$4,713,810 38	\$5,685,942 24
Motor vehicle fees rebated (deducted)	69,185 55 ¹	65,025 61 ¹
Net fees	\$4,644,624 83	\$5,620,916 63
Court fines received by the Treasurer and Receiver-General	208,173 27	264,551 53
Total receipts credited motor vehicle fees account	\$4,852,798 10	\$5,885,468 16
Personal services	\$299,945 23	\$337,737 02
Expenses	242,465 86	310,988 88
Total expenses	\$542,411 09	\$648,725 90

CHANGES IN SYSTEM.

The year 1922 completes the first year when both the registration certificates and licenses were made up from stubs attached to the application blanks which the applicant is re-

¹ The motor vehicle fees rebates is an item that probably is not given much thought or consideration by either the public or the Legislature. This amount is paid out by the Registry in small checks to each person who surrenders his certificate of registration and number plates before August 1, and also to each person registering a second motor vehicle in a lower horse-power classification than one formerly registered during the year. The requirements of the law are somewhat complicated, and a great amount of correspondence is necessary. During the summer months as many as 500 to 800 rebate checks a week are mailed. The checks are scheduled, and the Registry is reimbursed from the treasury for rebates paid. As many as six clerks are required on this item alone, which greatly increases the work of handling re-registrations. Many States pay no rebates on registrations.

quired to fill out in part. The stub, validated by the Registry clerk at the counter, is returned immediately to the waiting applicant, and is the only paper required by him for the entire year. Massachusetts is one of the very few States issuing permanent certificates and licenses over the counter, and the use of the stub partly filled out by the applicant is a great economy for the State and a benefit to the applicant in time saved at the counter.

DITTO SYSTEM AND ADVANCE REGISTRATIONS.

At the beginning of 1922 a new system of recording registrations was introduced. By the use of so-called "ditto" machines (duplicating devices) the registration records are copied once on the typewriter and then as many copies as necessary may be made. The Registry makes five copies: one for the official office records, showing ten registrations numerically arranged on each page and bound in books of 500 sheets; a second such list for public use; a third such list furnished the Auto List Publishing Company, which prints registrations in a book for commercial use; a fourth record printed on card stock and cut up in a cutting machine so that each sheet gives ten cards which are filed alphabetically according to the registrant's name; and a fifth list, also on card stock, which is cut up and filed by engine number of the car registered. A reference to any one of these five records gives all the information recorded, including owner's name and address, year, make and type of car registered, engine and maker's number, date registered, fee paid and number of plates assigned.

In addition, gummed slips are used in such a way that the owner's name and address is copied on them, and these slips are perforated so that they can be torn, thus giving the Registry small addressed labels, which are pasted on blanks, so that every person who had registered an automobile during 1922 was mailed a new blank for 1923 registration in October, 1922.

This system, on a conservative estimate, has saved the Department the services of twenty-five clerks for the entire year, and much temporary service formerly required in sending out blanks, etc.

INDEX OF LICENSES.

A change in the system of indexing licensed persons has also been made, so that each card serves for a ten-year record of the person licensed, the number and date of each renewal license being posted to the card which must necessarily be in the file. Cards are written only for new licenses. This system saves the necessity of writing over 300,000 new cards and destroying a like number of old cards each year, which used to be the procedure. But even more important is the fact that under this system clerks in the filing division of the Registry are practically prevented from any opportunity of error, because they must find the correct card before posting the new record. Under the old system many records were incorrectly destroyed. Now that every one must be examined for a license, loss of the record is even more vital, and might mean an examination not otherwise required.

The public insist on losing licenses and certificates regularly, and for their protection the files of the Registry are kept just as carefully as possible, and when the fact is considered that a total of nearly two million index cards and applications (two years' records) are on file and must be immediately available at all times, it is not surprising that an occasional record is lost or misfiled.

NATURE OF WORK PERFORMED.

The following statement shows the nature of the work performed in each of the seventeen main groups, known as sections, into which the activities of the Registry are divided, the title of the person in charge, and the number of employees:—

SECTION.	In Charge.	Number of Em- ployees.	Nature of Work.
Registrar's . .	Secretary.	5 clerks. 6 stenographers.	Administrative; revocations and suspensions; court abstracts; reports.
Chief clerk's . .	Secretary.	1 clerk. 1 stenographer.	Administrative, personnel; direction of issuance of registrations and licenses; acting registrar.
Examining and in- vestigating.	Chief inspector. Supervisor of clerks.	4 clerks. 8 stenographers. 66 inspectors.	Examining applicants for licenses; investigating motor vehicle accidents, etc.

SECTION.	In Charge.	Number of Em- ployees.	Nature of Work.
Headlight . .	Inspector.	Assistant inspector. 1 stenographer. 1 clerk.	Headlights; rear lights.
Statistics . .	Inspector.	2 stenographers.	Accident tabulation and analysis; data for safety campaign; publicity; police bulletins.
Motor vehicle identification.	Inspector. Supervisor of clerks.	15 clerks. 5 stenographers.	Engine number records; stolen car records; dealers' reports and investigations.
Counter . .	Supervisor. Assistant supervisor.	3 tellers. 16 clerks.	Issuing of number plates and renewal licenses to the public.
Springfield Branch	Clerk.	1 clerk.	Issuing of number plates and reissues only.
Mail . .	Supervisor. Assistant supervisor.	25 clerks.	Sorting mail; assigning number plates and licenses to mail applications.
Cashier . .	Cashier. Assistant cashier.	2 clerks.	Banking fees received by mail, counter and examining sections; accounting for same; analyzing and preparing registration and license statistics.
Correspondence .	Supervisor. Assistant supervisor.	13 stenographers. 5 clerks.	Letters on questioned applications, adjustments, general information.
Entering . .	Supervisor. Assistant supervisor.	28 typists.	Recording registrations; sorting renewal licenses; typewriting licenses.
Filing . .	Supervisor.	14 clerks.	Filing records; posting renewal licenses to records; phone information for public.
Miscellaneous .	3 assistant supervisors.	15 clerks. 6 stenographers.	Issuing duplicates and copies of certificates and licenses; sorting and mailing license renewal blanks; reissues and rebates entire work.
Shipping . .	Assistant supervisor.	10 clerks.	Addressing and shipping all number plates for mail; mailing out-going mail, — original licenses, renewal blanks, etc.
Supplies . .	Supervisor.	3 laborers. 1 stenographer.	Handling requests for supplies; handling all number plates for mail and counter; multigraphing and duplicating work.

RECOMMENDATIONS OF THE DEPARTMENT FOR LEGISLATION RELATING TO THE REGISTRY OF MOTOR VEHICLES.

See page 69 of this report.

DIVISION OF WATERWAYS AND PUBLIC LANDS.

BOSTON HARBOR.

THE COMMONWEALTH FLATS AT SOUTH BOSTON.

Commonwealth Pier No. 5.

As the business at this pier increased it became necessary to furnish additional means of access from the first to the second floor, especially from the level of Northern Avenue to the level of the Viaduct. Plans for a stairway to connect these levels were made when the pier was built, but such construction seemed unnecessary at that time. On Jan. 3, 1922, a contract was made with George M. Bryne to furnish materials and build a stairway from the street level of Northern Avenue to the Viaduct at a contract price of \$2,736. This work was completed April 24, 1922.

An examination of the railroad track trestle at the heating plant showed that the trestle was badly decayed and unsafe. A contract was made on Aug. 7, 1922, with William L. Miller Company to remove the existing trestle and construct a new one to replace it at a contract price of \$2,396. This work was completed Sept. 11, 1922.

Commonwealth Pier No. 6.

When this pier was built it was not deemed advisable to lay a permanent paving because of the possibility that serious settlement on the new filling might occur. The Commonwealth, however, agreed to relay the paving at any time within five years upon request from the Boston Fish Market Corporation. This repaving has been in progress at intervals for some years.

Under contract of Aug. 24, 1922, with the B. E. Grant Company the remainder of this repaving was completed Oct.

30, 1922, at a cost of \$23,686.24. This finishes the repaving required by the terms of the lease to the Boston Fish Market Corporation.

Development of Land South of Summer Street.

The city of Boston on May 27, 1921, laid out D Street from Fargo Street to Claflin Street and proceeded to build a sewer in the street so laid out. On June 5, 1922, the city laid out Claflin Street from D Street to C Street and proceeded to build a sewer in that street. The city also paved the portion of D Street laid out the previous year. It is expected that the section of Claflin Street laid out this year will be paved during the coming year.

In order that the paving might be carried on continuously the Commonwealth removed the temporary tracks crossing D Street and connected the tracks serving the land between D and E streets, north of the Army stores, with the tracks lying between the two Army stores on D and E streets. This leaves D Street entirely unobstructed by a railroad track except at Fargo Street, where the main line for serving all the territory south of Summer Street crosses.

During the year the Federal government released to the Commonwealth the easterly or No. 2 storehouse of the Army stores, four sections of the No. 1 storehouse, located on E Street, and the heating plant at the southerly end of storehouse No. 1.

The southerly half of storehouse No. 2 has been assigned to the Highway Division as a repair shop for trucks and road building machinery. A portion of the southeasterly corner is also used by this Division as a testing laboratory. To fit this portion of the building for these uses certain changes have been necessary.

The northerly half of this building is used by the Post Office Department as a repair shop for automobile trucks. The southwesterly corner of the storehouse has become the property of George C. Corcoran under an agreement for an exchange of property made April 8, 1921, to enable the Commonwealth to develop this territory.

Of the seven sections contained in storehouse No. 1, three are in use by the Quartermaster's Department, one has been

assigned to the Post Office Department for storage use, and three released to the Commonwealth remain unoccupied. The heating plant, furnishing heat to both storehouses, has been repaired and is at present operated by the Highway Division. The expense of this heating is shared by the Post Office Department. Negotiations are in progress for the lease of the unoccupied portions of this storehouse.

No additional sales of land have been made by the Commonwealth in this territory during the year.

When tracks were built by the Federal government to serve this property, it was found necessary to cross one end of a piece of land owned by the Standard Sanitary Manufacturing Company at the corner of B Street and Cypher Street. The arrangements made for this occupancy by the United States were only temporary. To acquire permanent rights in this area the Commonwealth is arranging to exchange for this piece of land a lot of substantially the same size located on C Street. The final details of this exchange are not yet completed.

Commonwealth Land off Summer Street.

When the sale was made to the United States of the land for the Army base, permission was given the Federal government to occupy for open storage an area lying between the Army base and the Viaduct leading to Commonwealth Pier, and between Summer Street and the railroad yard of the Commonwealth. Upon this area the Federal government built an extensive railroad yard for use during the war. As the development of the property proceeded the United States wished to acquire the larger part of this area for use as a permanent railroad yard in connection with the Army base.

Such use of this property did not appear to the Department to be advantageous, as it would interfere with the development for commercial purposes of the land near Summer Street. After lengthy negotiations an agreement has been reached by which the Federal government surrenders to the Commonwealth all rights in this property upon condition that a portion of the railroad yard will be left for use by the Commonwealth and may be used in time of emergency by the United States. From the remainder of the property near Summer Street the

Federal government is to remove all its tracks, leaving the area free for development by the Commonwealth. The details of this agreement are at present under consideration.

Temporary permits have been given for the use as freight loading stations of the platform of the freight house built by the Commonwealth at the foot of the ramp on D Street and of a location alongside the track leading into the easterly side of Commonwealth Pier. Permits have been granted also for the use of three small lots on Northern Avenue between Commonwealth Pier and the Fish Pier. This authority has been granted in each case with a provision for termination at short notice in order that no permit for use and occupancy of any part of this area may interfere with any general development of the property.

To develop the property lying southerly of Northern Avenue, bounded westerly by the land of the New York, New Haven & Hartford Railroad Company and southerly and easterly by the tracks to Commonwealth Pier, an arrangement was made with the railroad company to allow the construction of a street about 50 feet wide from Northern Avenue southerly across the tracks at the entrance to the State freight yard and over the location of the extension of B Street to an intersection with what was formerly Congress Street. This roadway is one-half on land of the Commonwealth and one-half on land of the railroad company, and is a private roadway for the use of the railroad company and to give access to property of the Commonwealth. The land of the railroad company bordering on the roadway is a freight yard.

The railroad company, in addition to allowing the use of its land, gave the use of the paving already laid on its portion of roadway. The Commonwealth agreed to repave the whole width of the new roadway and to put in the sewers and water pipes necessary to serve whatever buildings are erected later along the part of the roadway belonging to the Commonwealth. For carrying out this work a contract was made on May 1, 1922, with the B. E. Grant Company. Work was completed Sept. 22, 1922, at a cost of \$33,809.99. Toward this cost the New York, New Haven & Hartford Railroad Company made a contribution of \$2,000.

THE COMMONWEALTH FLATS AT EAST BOSTON.

Aircraft Landing Field.

Under the provisions of chapter 404 of the Acts of 1922, a lease was given on June 29, 1922, to the United States of America to use as an aircraft landing field an area of the Commonwealth flats at East Boston, including two runways, each 200 feet wide and 1,500 feet long, crossing at right angles, and an area 600 feet long and 400 feet wide for the location of hangars and other necessary buildings.

This lease was given at a rental of \$1 per year, as provided in the statute, with the privilege of annual renewal for a period of ten years.

Plans and specifications were prepared for the construction of the landing field by leveling the surface and covering it with cinders, and for the erection of two steel hangars each 120 feet long and 65 feet wide. The materials for these hangars above the foundations are to be furnished by the Federal government to the Commonwealth for the use of the militia.

On June 30, 1922, proposals were received for the construction of the field and the erection of hangars. At the prices submitted the cost of the work exceeded the appropriation made by chapter 404 of the Acts of 1922 by the sum of \$9,784. This amount was raised and contributed by the Boston Chamber of Commerce. The city of Boston also agreed to furnish and lay at its own expense the pipe to provide water to the hangars.

A contract was made on Aug. 15, 1922, with Vincent N. Bellizia for constructing the landing field and approaches at an estimated cost of \$35,744. For building foundations and erecting the two hangars a contract was made on Sept. 1, 1922, with Coleman Brothers, Inc., at an estimated cost of \$9,040.

Work on the construction of the landing field was begun at once, but has been seriously hindered by the wet weather. The work of grading is, however, nearly completed and the surfacing with cinders well advanced. The construction of the foundations for the hangars was not begun until Nov. 15, 1922. The water pipe has been laid and installed by the city

of Boston, and water is now being furnished through this pipe.

On Oct. 13, 1922, a permit was granted to the Massachusetts National Guard to erect two barrack buildings adjoining the hangars and just outside the area leased to the United States. These barracks will be used by the 101st Observation Squadron in connection with their use of the field.

The landing field is located on the northerly side of the filled area. This arrangement leaves the southerly side of the filled land free to be developed for commercial purposes and allows access to the land to the east on the southerly side of the proposed central basin.

Dredging, Filling and Bulkheads.

The filling of the flats at East Boston has been continued during the year under contract of May 11, 1921, with the Atlantic, Gulf and Pacific Company and under an extension of this contract authorized April 13, 1922. Dredging has been done to form a channel 200 feet wide and 25 feet deep along the southerly side of the central basin to a connection with the deep water outside the easterly end of Governor's Island. The material excavated is being used to build a dike between the existing fill and the northerly end of the bulkhead on the southerly side of the central basin, and another dike near the easterly end of the same bulkhead and extending southerly toward the bulkhead along the main channel front. The Department plans, if funds are available, to extend this easterly dike to the bulkhead on the channel front and to fill the area enclosed. During the year under contract with the Atlantic, Gulf and Pacific Company material to the amount of 2,119,630 cubic yards has been excavated and deposited.

At present the Commonwealth has about 120 acres of filled land at East Boston. By the filling of the basin enclosed by the two dikes 110 acres will be added, making a total of 230 acres.

In dredging the channel along the southerly side of the central basin in a section about 1,000 feet long, the material was found too hard to be excavated by the suction dredge. This area must be excavated later by scoop dredges. The channel is, however, deep enough now to be used for towing

scows with material for future filling, as it has a least depth of 13 feet at mean low water, 23 feet at high water and is 200 feet wide.

In connection with this work two sections of bulkhead have been built during the year under contract of May 29, 1922, with the William L. Miller Company. One section of 1,000 feet carries the bulkhead along the channel front to the line of ownership by the Federal government around Governor's Island. This work was done at a cost of \$28.40 per linear foot. The second section, about 600 feet long, extends the bulkhead along the southerly side of the central basin. This work was done at a cost of \$28 per linear foot. It is not expected that any more bulkhead work will be required until the basin previously described has been filled.

Work on these bulkheads was seriously delayed by the inability of the contractor to get lumber ordered from the Pacific coast. Only a small amount of work remains to be done, and the bulkheads will probably be finished during the winter.

East Boston Rail Connections.

Under the provisions of chapter 494 of the Acts of 1921 an agreement was made on June 27, 1922, with the East Boston Company for the acquisition by the Commonwealth for a railroad track of a right of way 60 feet wide across land already owned or to be acquired by the East Boston Company. The price for this land was fixed at 40 cents per square foot. This railroad track is to extend from the Boston & Albany Railroad tracks near Prescott Street to and across the tracks of the Boston, Revere Beach & Lynn Railroad to the property of the Commonwealth near Jeffries Point. A taking of this right of way was made by the Department on July 5, 1922.

A contract with J. F. Kennedy Company was made on Aug. 7, 1922, for building a railroad track about 3,000 feet long from the tracks of the Boston & Albany Railroad near Prescott Street through the strip taken from the East Boston Company and across the tracks of the Boston, Revere Beach & Lynn Railroad to the flats of the Commonwealth. The construction of the crossing with the tracks of the Boston, Revere Beach & Lynn Railroad was not included in this contract. Plans for

such crossing were submitted to the Department of Public Utilities for approval, as provided by the statute, with the request that said Department prescribe the method of protection by signals to ensure the safe operation of trains on the Commonwealth track and on the track of the Boston, Revere Beach & Lynn Railroad. The approval of these plans was received on Oct. 24, 1922, together with a description of the method of signaling required. Preparations are now being made to carry these plans into effect.

The grading of the location for the track has been substantially completed and a large part of the gravel ballast deposited. The rails and ties are on the ground, but the laying of the track has been delayed owing to the inability of the contractor to get the necessary tie plates. The track will probably not be completed before the frost leaves the ground in the spring.

DORCHESTER BAY DREDGING.

On April 12, 1922, a hearing was held upon the petition of the Savin Hill Yacht Club and others for dredging in front of the Savin Hill Yacht Club House.

A contract was made on May 8, 1922, with the Bay State Dredging and Contracting Company for dredging to the depth of 8 feet at mean low water of the basin in front of the club house of the Savin Hill Yacht Club at Savin Hill. The contract prices for the work were: for dredging the basin and disposing of dredged material, 49 cents per cubic yard, scow measurement; for removing and disposing of boulders, \$18 per cubic yard; for removing piles in area to be dredged and replacing same after completion of dredging, \$350.

This work was completed June 20, 1922, at a cost of \$13,-943.58. Toward the cost of this work the Savin Hill Yacht Club has made a contribution of \$500 and is to make a further contribution of \$500 in the coming spring.

Amount expended during the year, \$14,609.16.

Total expenditure to Dec. 1, 1922, \$84,780.47.

HINGHAM HARBOR.

On Feb. 17, 1922, a hearing was held upon a petition of George M. Thompson and others for redredging the channel and basin in this harbor.

A contract was made on Aug. 14, 1922, with W. S. Rendle & Son Company to redredge to a depth of 6 feet at mean low water the channel and anchorage basin in this harbor. The contract prices for this work were: for dredging and disposing of the dredged material, 32 cents per cubic yard, scow measurement; for removing and disposing of boulders, \$12 per cubic yard. This work was completed Nov. 17, 1922, at a cost of \$23,186.88.

Toward the cost of this work a contribution of \$3,500 was made by the town of Hingham.

Amount expended during the year, \$21,875.58.

Total expenditure to Dec. 1, 1922, \$38,056.27.

MALDEN RIVER.

In September a request was received from the Standard Oil Company of New York for the removal of a shoal at the upper end of this river just below the Medford Street bridge. Under an agreement with the Gerrish Dredging Company this shoal was excavated at a cost of \$1,200. Toward this cost the Standard Oil Company of New York made a contribution of \$600.

Amount expended during the year, \$1,268.70.

Total expenditure to Dec. 1, 1922, \$32,268.70.

MYSTIC RIVER.

In June a request was received from the Merrimac Chemical Company for additional dredging in the channel of this river below Malden bridge. The company agreed to contribute one-third of the cost of this work.

A contract was made on July 26, 1922, with W. S. Rendle & Son Company for dredging an area on the northerly side of the channel in Mystic River just below Malden bridge and the removal of a small shoal about 700 feet above the bridge,

all to the depth of 16 feet at mean low water. The contract prices for this work were: for dredging and disposing of the dredged material, 33 cents per cubic yard, scow measurement; for removing and disposing of boulders \$10 per cubic yard.

This work was completed Oct. 26, 1922, at a cost of \$11,535.82. Toward this cost the Merrimac Chemical Company made a contribution of \$4,182.50.

Amount expended during the year, \$10,970.48.

Total expenditure to Dec. 1, 1922, \$410,029.26.

DREDGING OFF NEW HAVEN DOCKS, SOUTH BOSTON.

In August a petition was filed by the New York, New Haven & Hartford Railroad Company asking that the area between the channel line and the railroad piers 1 and 2 be dredged to a depth of 30 feet at mean low water, to allow deep draft vessels to dock at these piers. Toward the cost of this work the company agreed to make a contribution of one-fourth of the cost, but not more than \$10,000.

A contract was made on Oct. 23, 1922, with the Bay State Dredging and Contracting Company for dredging to the depth of 30 feet at mean low water of a channel leading from the main ship channel in Boston Harbor to dock No. 1 of the New York, New Haven & Hartford Railroad at South Boston. The contract prices for this work are: for dredging the channel and disposing of the dredged material, 39.9 cents per cubic yard; for removing and disposing of all boulders, \$16 per cubic yard. This work is now in progress.

Amount expended during the year, \$17,873.71.

RIVERS, HARBORS, TIDEWATERS AND FORESHORES OUTSIDE OF BOSTON HARBOR.

For the improvement of rivers, harbors, tidewaters and foreshores outside of Boston Harbor, in accordance with the provisions of section 11 of chapter 91 of the General Laws, an appropriation of \$250,000 was available during 1922.

Petitions were filed with the Division during the year for surveys and improvements in the following localities: Bucks Creek, Chatham; Cape Poge Bay, Edgartown; Cedar Point,

Scituate; Crescent Beach, Mattapoisett; Duxbury Harbor, Duxbury; East Chop Sea Wall, Oak Bluffs; Essex River, Essex; Falmouth Inner Harbor, Falmouth; Lobster Cove, Gloucester; Lynn Harbor and Saugus River, Lynn; Megansett Harbor, Falmouth; Nobscusset Harbor, Dennis; North Scituate Beach, Scituate; Second Cliff, Scituate; Sesuit Harbor, Dennis.

Public hearings have been held, certain surveys and estimates of cost have been made, but no actual work has been done to carry out improvements petitioned for at: Bucks Creek, Chatham; Cape Poge Bay, Edgartown; Cedar Point, Scituate; Crescent Beach, Mattapoisett; Duxbury Harbor, Duxbury; East Chop Sea Wall, Oak Bluffs; Lobster Cove, Gloucester; Second Cliff, Scituate; Sesuit Harbor, Dennis.

Information relating to work previously done in various rivers and harbors in the Commonwealth may be found in the annual reports of the Board of Harbor and Land Commissioners, the Commission on Waterways and Public Lands, in previous reports of this Division, and in the tables in the Appendix accompanying the present report. These tables show localities, character of work, appropriations and expenditures by the Commonwealth and certain appropriations and expenditures by the Federal government.

An account of the work done during the year 1922 for the improvement of rivers, harbors, tidewaters and foreshores outside of Boston Harbor follows: —

ANNISQUAM RIVER.

In December, 1921, an examination of the riprap at the bank on the east side of the channel showed in two places a settling of the top stones of the riprap. Under an arrangement with the T. E. Reed Company the necessary repairs were made at a cost of \$1,639.54.

During the summer the attention of the Division was called to two shoals in this river, — one at Wolf Hill and the other opposite River View. Under an agreement with the Bay State Dredging and Contracting Company both these shoals were removed at a cost of \$6,811.35.

Amount expended during the year, \$9,204.04.

Total expenditure to Dec. 1, 1922, \$116,464.79.

BRANT ROCK, MARSHFIELD.

In December, 1921, the attention of the Division was called to the condition of the sea wall south of Brant Rock. An examination showed a wearing away of the beach under one of the jetties built by the Commonwealth in 1920 to support this wall. Under an agreement with Arthur J. Mitchell 101.75 tons of stone riprap were placed around this spur jetty. The cost of this work was \$610.65.

Amount expended during the year, \$698.15.

Total expenditure to Dec. 1, 1922, \$5,401.96.

ESSEX RIVER, ESSEX.

On Feb. 17, 1922, a hearing was held upon the petition of Carl C. Emery and others for dredging the channel in Essex River.

A contract was made on Aug. 7, 1922, with the Bay State Dredging and Contracting Company to dredge in this river a channel 6 feet deep at mean low water and 60 feet wide on the bottom from Cross Island to the highway bridge in Essex. The contract prices for this work are: for dredging and disposing of the dredged material, 54 cents per cubic yard, scow measurement; for removing and disposing of boulders, \$18 per cubic yard. This work is now in progress.

Amount expended during the year, \$33,428.33.

Total expenditure to Dec. 1, 1922, \$38,428.33.

FALMOUTH INNER HARBOR.

On Feb. 17, 1922, a hearing was held upon the petition of the selectmen of Falmouth and others for dredging in Falmouth Inner Harbor.

A contract was made on April 26, 1922, with William E. Burke for dredging in the entrance channel to this harbor to a depth of 10 feet at mean low water and a width of 100 feet on the bottom. The contract prices for this work were: for dredging and disposing of dredged material, 57 cents per cubic yard, scow measurement; for removing and disposing of

boulders, \$15 per cubic yard. This work was completed June 9, 1922, at a cost of \$7,794.75.

An examination of the west jetty in August of this year showed some leakage of sand through the joints of the older portion of the structure. Under an agreement with John A. Davis the sand west of the jetty was excavated and the holes in the jetty closed with concrete, at a cost of \$783.60.

Amount expended during the year, \$9,218.37.

Total expenditure to Dec. 1, 1922, \$108,536.17.

GLOUCESTER HARBOR.

On Feb. 17, 1922, a hearing was held upon the petition of the mayor of Gloucester and others for a continuation of dredging to deepen the channels to the upper harbor at Gloucester. At the hearing request was made for the removal of rocks dangerous to navigation in this harbor. The attention of the petitioners was called to the prohibitive cost of carrying out both dredging and rock removal, and those present were asked to indicate which in their opinion is the more necessary improvement. The removal of rocks was felt to be the more important at present. After this hearing other petitions asking for rock excavation were filed with the Division.

A contract was made on Sept. 22, 1922, with George T. Rendle for the removal of certain rocks and ledge from Gloucester Harbor at the following contract prices: for breaking up and removing the nine points or areas of ledge near Five Pound Island to the depth of not less than 16 feet at mean low water, the lump sum of \$14,993; for removing three isolated rocks or points of rock near Parkhurst's Wharf, the lump sum of \$750; for removing two isolated rocks or points of rock in Harbor Cove near the Parmenter-Rice and Atlantic Halibut Company's wharves, the lump sum of \$750; for removing one isolated rock or point of rock near the wharf of the Gloucester Fresh Fish Company, the lump sum of \$750; for removing three isolated rocks or points of rock near the head of the harbor, — one near the entrance to the dock between the wharves of Frank C. Pearce Company and the Gorton-Pew Fisheries Company and the other two opposite and about 170 feet southeasterly from the outer end of the

latter wharf, — the lump sum of \$750. This work is now in progress.

Amount expended during the year, \$11,192.32.

Total expenditure to Dec. 1, 1922, \$118,437.06.

HERRING RIVER, HARWICH.

The work of furnishing and placing riprap under contract of May 13, 1921, with William E. Burke was completed May 10, 1922, at a cost of \$5,168.46.

Further consideration was given during the year to the petition of J. Arthur Jacobs and others, heard during 1921, for protective work east of Herring River entrance at West Harwich. Inspections and examinations showed a rapid cutting back of the bank at this locality, constituting an increasing menace to property.

On Nov. 8, 1922, a contract was made with George T. Rendle for furnishing and placing about 3,500 tons of stone riprap and chips in a stone jetty east of the river entrance at West Harwich. The contract price for this work is: for furnishing and placing stone riprap in the jetty and as bank protection, \$5.19 per ton. Toward the cost of this work individuals interested made a contribution of \$3,000. This work is now in progress.

Amount expended during the year, \$6,823.28.

Total expenditure to Dec. 1, 1922, \$56,992.16.

HYANNISPORT.

The removal of boulders from the area back of the breakwater, under contract of May 13, 1921, with William E. Burke, was completed June 23, 1922, at a cost of \$2,250.

Amount expended during the year, \$5,334.65.

Total expenditure to Dec. 1, 1922, \$65,017.76.

LAKE ANTHONY.

During the progress of the work of dredging under contract of May 13, 1921, with William E. Burke, a request for an increase in the area to be dredged was received from the

selectmen of Oak Bluffs. In response to this request the dredging was increased by approximately 3,975 cubic yards. Toward the cost of this additional dredging the town of Oak Bluffs made a contribution of \$500.

The entire work of dredging was completed Feb. 17, 1922, at a cost of \$11,787.25.

Amount expended during the year, \$13,044.54.

Total expenditure to Dec. 1, 1922, \$75,531.24.

MEGANSETT HARBOR, FALMOUTH.

On Feb. 17, 1922, a hearing was held upon a petition of Warner V. Taylor and others for dredging Megansett Harbor, Falmouth. At this hearing the petitioners suggested that the dredged material might be deposited upon the shore in the vicinity.

Proposals were received May 26, 1922, upon specifications providing for the disposal of material upon the shore or for its deposit at sea. The lowest price received was for dredging and depositing the material at sea.

The summer residents at Megansett were, however, so desirous of having the dredged material placed upon the shore as a further improvement, that an agreement was executed to pay to the Commonwealth the difference between the lowest price named in the proposals received and the price for dredging and depositing the material upon the shore.

A contract was accordingly made on June 13, 1922, with the Gerrish Dredging Company to dredge in this harbor to the depth of 6 feet at mean low water and to deposit the material upon the shore in certain specified localities. The contract prices for this work were: for dredging and disposing of the dredged material, 49 cents per cubic yard, measured *in situ*; for removing and disposing of boulders, \$12 per cubic yard. This work was completed Sept. 11, 1922, at a cost of \$17,640.00.

Toward this cost a contribution of \$2,500 was made by the town of Falmouth. In addition, in accordance with the agreement previously mentioned, the Commonwealth was reimbursed in the sum of \$2,880.

Amount expended during the year, \$18,389.89.

Total expenditure to Dec. 1, 1922, \$52,116.66.

MENAMSHA INLET.

The work of jetty repairs and resetting of the light at the entrance to this inlet, under contract of May 13, 1921, with William E. Burke, was completed Feb. 21, 1922, at a cost of \$1,426.22.

The dredging authorized by the terms of this contract was increased during the year to allow the excavation of an additional channel in this harbor. The entire work was completed May 6, 1922, at a cost of \$10,819.20.

Amount expended during the year, \$13,413.89.

Total expenditure to Dec. 1, 1922, \$78,039.50.

NEW BEDFORD HARBOR.

During the winter the attention of the Division was called to difficulties experienced by steamers approaching the State pier on account of a shoal lying between the two channels dredged by the United States opposite this pier. To provide a more adequate approach a contract was made on March 14, 1922, with the Bay State Dredging and Contracting Company to dredge about 33,000 cubic yards of material opposite the State pier to a depth of 25 feet at mean low water. The contract prices for this work were: for dredging and disposing of the dredged material, 34 cents per cubic yard, scow measurement; for removing and disposing of boulders, \$20 per cubic yard.

During the progress of the work additional dredging was authorized, so that 49,259 cubic yards of material were actually removed. This work was completed April 14, 1922, at a cost of \$16,748.06.

Amount expended during the year, \$17,446.81.

Total expenditure to Dec. 1, 1922, \$18,856.57.

NOBSCUSSET HARBOR.

By chapter 351 of the Special Acts of 1915 the Board of Harbor and Land Commissioners was authorized to dredge a channel and anchorage basin in the vicinity of Old Corporation Wharf, so called, in the town of Dennis, and to expend for

the purposes of the act a sum not exceeding \$10,000, provided the town accepted the act and voted to build a public wharf and landing and an approach thereto. The town, at a special meeting held June 26, 1915, voted to accept the act and appropriated \$500 for building a public wharf, landing and approach.

On Aug. 4, 1915, a contract for this dredging was made with John H. Gerrish. By the terms of the contract the work was to be completed Feb. 1, 1916. At that date no work had been done and the contract was accordingly terminated in February, 1916.

Proposals were readvertised and a contract made on April 11, 1916, with the Maryland Dredging and Contracting Company. War conditions made it impossible for this company to continue the work at the contract price, nor was the contractor willing to resume work after the war.

In order to carry out the work a contract was made on Aug. 25, 1922, with William E. Burke for dredging to the depth of 5 feet at mean low water the basin and channel behind the breakwater at Nobscusset Harbor. The contract prices for this work were: for dredging and disposing of the dredged material, 73 cents per cubic yard; for removing and disposing of boulders, \$16 per cubic yard. This work was completed Nov. 4, 1922, at a cost of \$9,490.

Amount expended during the year, \$9,321.73.

Total expenditure to Dec. 1, 1922, \$38,355.34.

OAK BLUFFS SEA WALL.

The work of protecting the northerly end of the sea wall on the easterly side of Sea View Avenue, under contract of Nov. 18, 1921, with the T. A. Scott Company, Inc., was completed Jan. 19, 1922, at a cost of \$6,018.49.

Amount expended during the year, \$7,422.88.

Total expenditure to Dec. 1, 1922, \$36,574.25.

SAUGUS RIVER.

A survey made during the summer of the outer end of the entrance channel to this river revealed a shoaling to a navigable depth of 8 feet from the depth of 12 feet previously dredged.

A contract was made on Aug. 7, 1922, with the Bay State Dredging and Contracting Company to dredge this channel to a depth of 12 feet at mean low water for a width of 250 feet and a length of about 1,500 feet. The contract prices for this work were: for dredging and disposing of the dredged material, 64 cents per cubic yard, scow measurement; for removing and disposing of boulders, \$18 per cubic yard. This work was completed Oct. 4, 1922, at a cost of \$33,765.50.

Amount expended during the year, \$34,989.18.

Total expenditure to Dec. 1, 1922, \$163,431.53.

SCITUATE SEA WALLS.

The work of protecting the shores in the town of Scituate from damage by the sea has been continued during the year under the provisions of chapter 585 of the Acts of 1920. Conferences were held at the beginning of the year with the Plymouth County commissioners and the selectmen of Scituate to consider reports of the engineering department and to determine where the need for shore protection seemed most urgent. The work of the year has been carried on in accordance with the decisions reached at these conferences.

Glades. — The work of building the sea wall under contract of Sept. 14, 1921, with Arthur J. Mitchell was completed May 6, 1922, at a cost of \$16,526.77.

Later in the year the gap in this wall between the two sections built last year was raised to the height of the new wall. This work was done in connection with the work at the wall near Beach Street.

North Scituate, Beach Street. — On May 1, 1922, a contract was made with John Williams & Co. for the construction of about 40 spur jetties and 1,015 feet of concrete facing in front of the existing wall east of Beach Street. The contract price for furnishing materials and building the concrete wall facing and spur jetties was \$10.90 per cubic yard of concrete measured in the completed work.

Before the completion of the contract other repair work in the vicinity became necessary and was included under this contract. Additional jetties were built in front of the wall south of the life saving station, a short section of wall ad-

joining the north side of the life saving station was repaired, and work done for the maintenance of certain old jetties in the locality.

Work under this contract was completed Aug. 22, 1922, at a cost of \$14,600.05.

Sand Hills. — On May 1, 1922, a contract was made with W. F. Loud & Sons Company for the construction of about 250 linear feet of concrete sea wall, with return on one end, and 5 concrete spur jetties. The contract prices for this work were: for furnishing materials and constructing the main wall and return wall, \$12.25 per cubic yard of concrete measured in the completed work; for furnishing materials and constructing each spur jetty, \$100 for each complete jetty 15 feet long.

During the progress of the work a request was received from the selectmen that an opening be left in this wall opposite the lot owned by the town and used as a bathing beach. Arrangements were accordingly made with the contractor to leave the opening requested and to furnish and fit planks to allow the closing of the gap during the winter. The selectmen assumed responsibility for the placing of these planks and for any damage that may result from the leaving of this opening. In accordance with a later request of the selectmen the wall was extended 35 feet at its northerly end to afford additional protection.

This work was completed July 12, 1922, at a cost of \$4,858.34.

Third Cliff. — On Feb. 10, 1922, a contract was made with W. H. Connor & Son Company to place stone riprap to protect the face of the northerly portion of the bluff at Third Cliff and to place stone chips and riprap in front of the sea wall between First and Second Cliffs. The contract prices for this work are: for furnishing the stone riprap and depositing it in place for a distance of about 450 feet on the northerly end of Third Cliff, \$3.87 per ton; for furnishing the stone riprap and depositing it in place upon the remainder of the area to be protected at Third Cliff, \$4 per ton; for furnishing the stone riprap and depositing it in place in front of the sea wall between First and Second Cliffs, \$3.75 per ton.

The work under this contract can be done best during the cold weather while the ground is frozen. The contractor,

however, was able to do only a small part of the work before the warm weather came in the spring. The work was therefore stopped during the summer and fall but is to be resumed early in the winter.

Amount expended under this contract during the year, \$1,002.57.

Total expenditure on shore protection at above locations to Dec. 1, 1922, \$132,001.64.

TAUNTON RIVER, SOMERSET.

The work of dredging an area between Slades Ferry bridge and Brightman Street bridge, under contract of Nov. 3, 1921, with the Bay State Dredging and Contracting Company, was completed March 8, 1922, at a cost of \$25,854.94. Toward the cost of this work the New England Oil Refining Company made a contribution of \$12,500.

Amount expended during the year, \$24,061.78.

Total expenditure to Dec. 1, 1922, \$28,697.18.

WEST BAY, BARNSTABLE.

The work of protecting the bank east of the entrance channel and the crest of the beach west of the west jetty, under contract of May 13, 1921, with William E. Burke, was completed Jan. 25, 1922, at a cost of \$6,477.72.

Amount expended during the year, \$4,352.41.

Total expenditure to Dec. 1, 1922, \$88,420.36.

WESTERN AVENUE SEA WALL, GLOUCESTER.

Chapter 502 of the Acts of 1922 provides for co-operative action by the Division, the county of Essex and the city of Gloucester in the construction of a sea wall, park and roadway along a portion of Western Avenue. The Division is authorized to build the sea wall at a cost not to exceed \$60,000, but may expend from State funds only \$25,000, and is not to undertake the work until the receipt from the city of the sum necessary to complete the wall.

On Oct. 16, 1922, complete plans and specifications for the sea wall were filed with the county commissioners and the city council in accordance with the provisions of the act.

The Essex County commissioners, by vote of Oct. 17, 1922, accepted this act and the city council passed a vote in acceptance Oct. 18, 1922.

Proposals were received by the Division Oct. 13, 1922. Early in November the city of Gloucester forwarded a contribution of \$35,000 toward the cost of the work.

On Nov. 10, 1922, a contract was made with the Bay State Dredging and Contracting Company to build about 76 linear feet of granite sea wall, 1,008 linear feet of granite-faced concrete sea wall, and 47 linear feet of concrete sea wall, together with three sets of granite steps, south of Western Avenue, near the mouth of Annisquam River, Gloucester. This work is now in progress.

Amount expended during the year, \$3,371.

WITCHMERE HARBOR, HARWICH.

The work of placing stone chips along the west side of the westerly jetty, under contract of Nov. 18, 1921, with the T. A. Scott Company, Inc., was completed Jan. 3, 1922, at a cost of \$2,193.78.

Amount expended during the year, \$3,039.90.

Total expenditure to Dec. 1, 1922, \$38,005.

MISCELLANEOUS.

GREAT PONDS.

Jurisdiction over great ponds belonging to the Commonwealth was conferred upon the former Board of Harbor and Land Commissioners by chapter 318 of the Acts of 1888. This act applies to ponds containing in their natural state 10 or more acres of land. Authority to sell and convey or lease, subject to the approval of the Governor and Council, any of the islands owned by the State in great ponds, was later conferred by chapter 379 of the Acts of 1904, now section 2 of chapter 91 of the General Laws.

During the year the Division has considered matters relating to: Baddacook Pond, Groton; Furnace Pond, Pembroke; Great Pond, Edgartown; Greenwater Pond, Becket; Indian Head Pond, Hanson and Pembroke; Lake Quinsigamond, Shrewsbury; Lake Winthrop, Holliston; Little Island Pond,

Plymouth; Long Pond, Blandford; Long Pond, Tyringham; Monponsett Ponds, Halifax and Hanson; Morse Pond, Wellesley; Niles Pond, Gloucester; Shiverick Pond, Falmouth; Shubael Pond, Barnstable; Silver Lake, Pittsfield; Snipatuit Pond, Rochester; Spy Pond, Arlington; Swan Pond, Dennis; Uncas Pond, Franklin; Yokum Pond, Becket.

A list of the lakes and ponds of the State with areas of 10 or more acres, given by counties, is printed in the report of the Commission on Waterways and Public Lands on "Water Resources of Massachusetts, 1918."

By chapter 12 of the Resolves of 1921 the Division of Waterways and Public Lands was directed to make surveys, examinations and maps of the great ponds in the Commonwealth except those under the jurisdiction of any State board, commission or department other than the Department of Public Works, and was authorized to expend \$5,000 for this purpose during the years 1921 and 1922. In accordance with this statute surveys have been made during the year of the following ponds: —

NAME.	Town.	Area surveyed (Acres).	Natural Area (Acres).	Maximum Depth (Feet).
North Cotuit or Hamlin's Pond	Barnstable	148.6	148.6	47.0
Middle Cotuit Pond	Barnstable	108.0	108.0	38.2
South Cotuit Pond	Barnstable	118.0	118.0	67.5
Shubael Pond	Barnstable	28.7	28.7	17.2
Pond north of Hamlin's Pond	Barnstable	10.4	10.4	—
Oldham Pond	Hanson and Pembroke	234.7	234.7	14.8
Furnace Pond	Pembroke	106.6	106.6	9.0
Great Sandy Bottom Pond	Pembroke	108.5	108.5	23.6
Little Sandy Bottom Pond	Pembroke	61.2	61.2	16.4
Indian Head Pond	Hanson	120.5	120.5	8.7
Maquan Pond	Hanson	48.0	48.0	13.5
Greenwater Pond	Becket	92.97	59.66	37.5
Long Pond or Upper Goose Pond	Lee and Tyringham	49.0	44.3	26.7
Goose Pond	Lee and Tyringham	246.0	167.7	35.6
Shiverick's Pond	Falmouth	10.8	10.8	—
Long Pond ¹	Blandford	84.0	{ 14.8 ² 13.6 ³ }	32.4

¹ Two natural ponds flooded to form this pond.

² North.

³ South.

The following ponds were found in their present condition to have been raised to a greater level than the original pond by building dams at their outlets in order to store water or the creating of waterpower: Greenwater Pond, Becket; Long Pond or Upper Goose Pond, Lee and Tyringham; Goose Pond, Lee and Tyringham; Long Pond, Blandford.

In addition an examination was made of Cranberry Meadow Pond in Spencer and Charlton, which showed this body of water to be wholly an artificial pond.

Amount expended during the year, \$2,415.81.

Total expenditure to Dec. 1, 1922, \$4,915.80.

CONSERVING AND EQUALIZING THE FLOW OF WATER IN RIVERS AND STREAMS.

By chapter 87 of the Resolves of 1918 a special commission on the water resources of the Commonwealth of Massachusetts was created, including in its membership the chairman of the Commission on Waterways and Public Lands, to investigate the water resources of the Commonwealth, and the report of the special commission was printed as Senate Document No. 298 of 1919.

By chapter 359, Acts of 1909, chapter 564, Acts of 1912, and chapter 84, Resolves of 1917, co-operation was established between the Commonwealth and the Water Resources Branch of the United States Geological Survey, whereby data relating to the gauging of streams within the Commonwealth and other work of a similar character carried on by the said survey have been obtained for use by the Division, said data being available for other departments of the Commonwealth.

Toward the cost of this work the Commonwealth has paid during the year \$2,999.70.

STATE BOUNDARY LINES.

During the perambulation in 1920 of the boundary lines of the Commonwealth seven bounds on the New York line were found insecurely set. In September, 1922, six of these bounds were reset in concrete and one reset in a good quality of gravel. All the bounds on this line are now in good condition.

At this time also the brush and growth along the line from Mount Prospect to the Seventh Mile Post was cut so that the line could be easily found.

During the year request was received from the selectmen of Munroe, Mass., and Readsboro, Vt., to change the position of a bound on the Massachusetts-Vermont line from the easterly side of the Old Tower Road to a new road recently built to replace the older one. This involved moving the bound a distance of 395 feet.

The equipment for taking up this bound, transporting and resetting it was provided by the two towns. Under the direction of a representative of the Department the bound was reset in a substantial manner on the easterly side of the new road.

PROVINCE LANDS.

The territory belonging to the Commonwealth known as the Province Lands at Provincetown comprises about 3,390 acres lying northerly and westerly of a line described in chapter 470 of the Acts of 1893. By the terms of this act the Board of Harbor and Land Commissioners was given general care and supervision of this area.

Reclamation work has been carried on under the direction of a superintendent since 1894. To check the movement of the sand the barren dunes are first covered with brush or planted with beach grass. The grass is pulled in bunches about 2 inches thick and transplanted in rows about 4 feet apart and 6 inches deep. This transplanted grass lives between four and five years. This work is followed and reinforced by the transplanting of trees and shrubs.

During the year work on these lands has been continued in accordance with these methods. Thirty-five acres of sand dunes have been covered with brush, and 8 acres of bayberry transplanted. In addition, 50,000 Scotch pines and 27,000 pines on the sod have been transplanted.

The sum of \$180.70 has been paid into the State treasury during the year from licenses issued for cultivating and picking cranberries on the bogs and for mowing meadowlands.

Amount expended during the year, \$4,175.12.

Total expenditure to Dec. 1, 1922, \$93,303.68.

MASSACHUSETTS ATLAS SHEETS AND TOWN BOUNDARY ATLASES.

Under authority of chapter 57, Resolves of 1890, chapter 42, Resolves of 1891, chapter 360, Acts of 1900, and chapter 69, Resolves of 1915, 4,904 atlas sheets of the map of the Commonwealth and 10 town boundary atlases have been sold during the year ending Nov. 30, 1922, for which \$732.55 was received and forwarded to the Treasurer and Receiver-General.

No atlases were delivered during the year under the authority of chapter 360, Acts of 1900, as amended by chapter 484, Acts of 1909.

RE-ESTABLISHMENT OF CERTAIN TRIANGULATION STATIONS.

By section 33 of chapter 91 of the General Laws the Division is authorized to make such surveys and do such other work as may be required by any order of the Land Court to re-establish and permanently mark triangulation points and stations previously established in connection with the topographical survey of the Commonwealth and the town boundary survey, and to obtain the geographical position of such new points and stations as may be required by the court.

During the year the location of the following triangulation stations was determined and permanently marked on the ground, and their geographical positions furnished to the Land Court: 4 stations in Franklin; 6 stations in Sutton; 5 stations in Grafton; 4 stations in Wellesley; 7 stations in Worcester; 7 stations in Wareham.

In addition, the same party determined the position of 31 stations as a basis for surveys for dredging in Essex River and for surveys of great ponds and established certain points to mark the ranges giving the exterior line of the Commonwealth off Nantucket.

SPECIAL REPORTS TO THE LEGISLATURE.

During the year the Division of Waterways and Public Lands has made the following special reports to the State Legislature:—

Western Avenue Sea Wall, Gloucester.—Report made Jan.

13, 1922, under the provisions of chapter 16 of the Resolves of 1921 (House, No. 637 of 1922).

Dennis-Yarmouth Boundary Line in Tidewater on Nantucket Sound Side. — Report made January, 1922, under the provisions of chapter 21 of the Resolves of 1921 (House, No. 1227 of 1922).

Waterway between Taunton River and Massachusetts Bay. — Report made Jan. 14, 1922, under the provisions of chapter 18 of the Resolves of 1921 (House, No. 1261 of 1922).

LICENSES AND PERMITS.

During the year 82 licenses were granted for various work to be done in tidewaters, great ponds, Connecticut River and Merrimack River and 86 permits for miscellaneous purposes. The Division also approved 94 permits granted by cities and towns for the construction and maintenance of fish weirs in tidewaters.

RECOMMENDATIONS OF THE DEPARTMENT FOR LEGISLATION RELATING TO THE DIVISION OF WATERWAYS AND PUBLIC LANDS.

See page 69 of this report.

APPENDIX.

RECEIPTS DURING FISCAL YEAR 1922.

Port of Boston Fund.

Rent under leases and permits	\$74,673 41	
Use of Commonwealth Pier No. 5	141,943 86	
Use of Commonwealth Pier No. 1	6,679 98	
Use of Maverick Street property	720 00	
Use of Haywards Creek property	398 50	
Inspection of dumping, Boston Harbor . .	4,278 67	
Dumping at receiving basins	8,354 72	
License charges	1,757 75	
Sale of plans	58 00	
Pay station receipts	171 52	
Sale of land, South Boston	25,944 52	
Sale of transformers	670 25	
		<hr/>
		\$265,651 18

Waterways Fund.

Inspection of dumping, outside Boston Harbor	\$1,713 49	
License charges	2,876 87	
		<hr/>
		4,590 36

Income, New Bedford Pier.

Use of State pier, New Bedford	14,125 00
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Income, Division of Waterways and Public Lands.

Use of Province Lands	\$180 70	
Sale of Massachusetts Atlas sheets	732 55	
Certified copies of documents	57 00	
Plans and specifications	142 00	
		<hr/>
		1,112 25
Interest on bank accounts	746 36	
		<hr/>
		\$286,225 15

EXPENDITURES FOR DEVELOPMENT AND IMPROVEMENT IN BOSTON HARBOR, 1859-1922, INCLUSIVE.

PAYMENTS.	Boston Harbor.	Com-monwealth Flats at East Boston.	Com-monwealth Flats at South Boston.	Com-monwealth Pier No. 5.	Com-monwealth Pier No. 6.	Dry Dock.	Haywards Creek.	Mystic River.
To Nov. 30, 1921	\$1,654,288 88 ¹	\$2,093,029 19	\$5,462,210 65	\$4,063,187 49	\$1,067,508 90	\$3,162,401 15	\$385,684 88	\$399,058 78
1922.								
Aircraft landing field	-	14,578 02	-	-	-	-	-	-
Street and pier development	-	1,531 25	101,645 67	-	20,706 89	-	-	-
Railroad tracks and roadways, South Boston	-	-	2,871 14	-	-	-	-	-
Dredging and filling	415 00	415,175 65	546 52	-	-	-	-	-
Extension of East Boston bulkhead	-	52,230 48	-	-	-	-	-	-
Railroad tracks, East Boston	-	105,325 62	-	-	-	-	-	-
Completing dry dock	-	-	-	-	-	2,250 00	-	-
Boston Harbor, minor channels	17,873 71	-	-	-	-	-	-	10,970 48 ²
Chapter 129, Acts of 1922	-	-	-	-	-	-	-	-
	\$1,672,577 59	\$2,681,870 21	\$5,546,567 09	\$4,063,187 49	\$1,088,305 79	\$3,164,651 15	\$385,684 88	\$410,029 26

¹ Contribution by Quincy Market Cold Storage and Warehouse Corporation, \$4,000.² Contribution by Merrimac Chemical Company, \$4,182.50.

DEPARTMENT OF PUBLIC WORKS.

EXPENDITURES FOR DEVELOPMENT AND IMPROVEMENT IN BOSTON HARBOR, 1859-1922, INCLUSIVE — *Concluded.*

PAYMENTS.	Malden River.	Chelsea Creek.	Commercial Point, Dorchester Bay.	Commonwealth Pier No. 1, East Boston.	Commonwealth Pier No. 5, Operation and Maintenance.	Commonwealth Pier No. 1, Maintenance.	Maintenance of Other Property of Commonwealth.
To Nov. 30, 1921	\$31,000 00 ¹	\$60,305 86	\$53,213 10	\$1,191,274 26	\$338,309 97	\$32,234 63	\$255,861 64
1922.							
Aircraft landing field	-	-	-	-	-	-	-
Street and pier development	-	-	-	-	-	-	-
Railroad tracks and roadways, South Boston	-	-	-	-	-	-	-
Dredging and filling	-	-	-	-	-	-	-
Extension of East Boston bulkhead	-	-	-	-	-	-	-
Railroad tracks, East Boston	-	-	-	-	-	-	-
Completing dry dock	-	-	-	-	-	-	-
Boston Harbor, minor channels	1,268 70 ²	34 87	-	-	-	-	-
Chapter 126, Acts of 1922	-	-	-	-	102,340 55	8,147 26	41,943 35
	\$32,268 70	\$60,340 73	\$53,213 10	\$1,191,274 26	\$440,650 52	\$40,381 89	\$297,804 99

Grand total, \$21,128,807. 65.

¹ Expended by United States government.² Contribution by Standard Oil Company of New York, \$600.

APPROPRIATIONS, CONTRIBUTIONS AND EXPENDITURES FOR IMPROVEMENT OF SMALL HARBORS AND CHANNELS WITHIN BOSTON HARBOR, UNDER THE DIRECTION OF THE DEPARTMENT OF PUBLIC WORKS, DIVISION OF WATERWAYS AND PUBLIC LANDS, AND ITS PREDECESSORS, FROM 1893 TO 1922, INCLUSIVE.

LOCALITY.	Character of Work.	Total Appropriation.	Contributions by Municipality or Others.	Total Expenditure.
Cottage Park Channel, Winthrop.	Dredging . . .	\$21,033 42	\$1,000 00	\$22,012 08
Dorchester, easterly shore, Boston.	Dredging . . .	84,472 82	500 00	84,780 47
Harbor View, Boston . .	Dredging . . .	10,146 00	—	146 00
Hingham Harbor . . .	Dredging . . .	31,556 27	6,500 00	38,056 27
Houghs Neck Channel, Quincy	Dredging . . .	26,989 58	3,500 00	28,489 58
Island End River, Everett .	Survey . . .	264 10	—	264 10
Jeffries Point Channel . .	Dredging . . .	12,961 90	—	2,961 90
Mystic River (near Lawrence and Wiggin's Wharf).	Dredging . . .	5,927 70	—	5,927 70
Neponset River . . .	Dredging . . .	45,014 48	—	45,113 34
Old Harbor Cove . . .	Dredging . . .	9,821 69	—	9,821 69
Orient Heights Channels . .	Dredging . . .	45,679 15	—	45,323 67
Pleasant Park Yacht Club Channel.	Dredging . . .	3,154 92	—	3,154 92
Point Shirley . . .	Dredging . . .	3,713 37	—	3,713 37
Shirley Gut, Boston and Winthrop.	Dredging . . .	1,906 20	—	1,906 20
South Boston, southerly shore	Dredging . . .	129,542 12	—	129,542 08
Stony Beach, Hull . . .	Sea wall . . .	11,794 85	—	11,522 02
Weir River, Hull . . .	Dredging . . .	105,963 51	25,000 00	130,963 51
Wessagussett Channel . .	Dredging . . .	815 20	—	815 20
Weymouth Fore River . .	Dredging . . .	47,194 37	—	32,269 88
Winthrop Harbor Channels .	Dredging . . .	41,038 16	700 00	39,783 58
Wollaston Channel . . .	Dredging . . .	47,656 14	3,000 00	50,234 75
		\$686,645 95	\$40,200 00	\$686,802 31

CONTRIBUTIONS AND EXPENDITURES FOR RIVER AND HARBOR WORK FROM DEC. 1, 1921, TO NOV. 30, 1922, UNDER CHAPTER 481, ACTS OF 1909, AND CHAPTER 91 OF THE GENERAL LAWS.

LOCATION.	Character of Work.	Contributions.	Expenditures.
Annisquam River	Dredging	—	\$7,421 80
Brant Rock, Marshfield . . .	Riprap	—	698 15
Cohasset Harbor	Survey	—	119 59
Duxbury Bay	Survey	—	171 96

CONTRIBUTIONS, ETC. — *Concluded.*

LOCATION.	Character of Work.	Contributions.	Expenditures.
Ellisville Harbor	Breakwater	-	\$723 57
Essex River	Dredging	-	33,428 33
Falmouth Inner Harbor . . .	Dredging	-	8,434 77
Glades, North Scituate . . .	Sea wall	-	11,676 77
Gloucester Harbor	Rock excavation and sea wall	\$3,300 00	12,563 32
Great ponds	Survey	-	2,415 81
Herring River	Dredging and riprap . . .	-	6,823 28
Humarock Beach, Scituate . .	Sea wall	18,981 01	-
Hyannisport	Removing boulders and dredging.	-	5,334 65
Improvement of rivers and harbors .	General expenses	-	2,355 13
Lobster Cove, Gloucester . . .	Survey	-	541 90
Lake Anthony, Oak Bluffs . .	Dredging	3,000 00	13,044 54
Mattapoisett Harbor	Survey	-	255 48
Megansett Harbor	Dredging	5,380 00	18,389 89
Menamsha Inlet	Dredging	-	11,827 35
New Bedford Harbor	Dredging	-	17,446 81
Nobscusset Harbor, Dennis . .	Strengthening jetty and dredging.	-	9,321 73
Oak Bluffs	Riprap protection	-	5,365 78
Saugus River	Dredging	-	34,989 18
Scituate sea walls	Shore protection	27,938 57	22,369 18
Taunton River	Dredging	12,500 00	24,061 78
Wareham	Survey	-	218 66
Warrens Cove, Plymouth . . .	Sea wall	-	280 77
West Bay, Osterville	Riprap	-	202 76
West Harwich	Jetty	3,000 00	31 25
Wild Harbor	Jetty extension	-	2,884 54
Witchmere Harbor	Jetty and dredging	-	2,710 83
		\$74,099 58	\$256,109 56

APPROPRIATIONS, CONTRIBUTIONS AND EXPENDITURES FROM 1893 TO 1922, INCLUSIVE, FOR RIVER AND HARBOR WORK, UNDER THE DIRECTION OF THE DEPARTMENT OF PUBLIC WORKS, DIVISION OF WATERWAYS AND PUBLIC LANDS, AND ITS PREDECESSORS (EXCEPTING BOSTON HARBOR).

LOCALITY.	Character of Work.	Total Appropriation.	Contributions by Municipality or Others.	Total Expenditure.
Acushnet River . . .	Inspection and dredging.	\$118,764 85	—	\$118,764 85
Allens Harbor, Harwich . . .	Surveys . . .	302 00	—	302 00
Allens Pond, Dartmouth . . .	Survey . . .	195 95	—	195 95
Annisquam River, Gloucester . . .	Dredging, removing ledges and riprap.	116,834 67	—	116,464 79
Apponagansett Harbor and River, Dartmouth.	Survey, dredging and stone breakwater.	56,159 59	—	55,786 05
Barnstable Harbor . . .	Survey and dredging	17,392 18	\$1,500 00	18,554 64
Bass River, Beverly . . .	Dredging . . .	25,539 81	55,535 75	81,075 56
Bass River, Dennis and Yarmouth.	Jetties, dredging and survey.	88,089 74	2,500 00	89,104 74
Brant Rock, Marshfield . . .	Sea wall . . .	5,401 96	—	5,401 96
Bucks Creek, Chatham . . .	Jetties, survey and dredging.	29,739 06	1,500 00	31,067 74
Buzzards Bay, Falmouth . . .	Survey . . .	166 11	—	166 11
Cataumet Harbor ¹ . . .	— —	—	—	—
Centerville River, Barnstable . . .	Dredging . . .	6,103 22	1,500 00	7,603 22
Cohasset Harbor, Cohasset and Scituate.	Breakwater and dredging.	36,292 14	20,691 88	56,984 02
Concord River, Billerica . . .	Removing boulders . . .	1,514 59	150 00	1,664 59
Connecticut River . . .	Investigation of navigation and surveys.	10,637 04	—	6,970 99
Connecticut River . . .	Improvement . . .	103 63	—	103 63
Connecticut River, Agawam . . .	Protective work . . .	20,396 09	—	18,814 42
Connecticut River, Chicopee . . .	Survey, wall and riprap.	25,149 02	640 00	25,789 02
Connecticut River, Hadley . . .	Protective work and diversion wall.	100,443 65	500 00	97,740 94 ²
Connecticut River, Hatfield . . .	Dikes and riprap. . .	14,751 82	1,000 00	14,952 57
Connecticut River, Holyoke . . .	Marking and lighting old piers.	766 36	—	766 36
Connecticut River, Holyoke . . .	Dredging and protective work.	18,815 78	415 00	4,230 78
Connecticut River, Northampton.	Protective work . . .	1,525 80	—	1,524 20
Connecticut River, South Hadley.	Wall . . .	6,406 36	1,000 00	7,379 58
Connecticut River, West Springfield.	Protective work . . .	12,002 78	—	11,919 27 ³
Conservation of waters . . .	Investigation . . .	43,999 96	—	41,765 92
Cotuit Harbor, Barnstable . . .	Dredging and survey	60,248 02	2,000 00	59,219 91
Cuttyhunk Harbor, Gosnold . . .	Jetties and dredging . . .	61,828 25	9,000 00	70,754 18
Deacons Pond Harbor, Falmouth. ⁴	— —	—	—	—
Duxbury Bay and Harbor . . .	Dredging . . .	27,970 75	—	27,970 75

¹ See Megansett Harbor.³ From 1891, inclusive.² From 1888, inclusive.⁴ See Falmouth Inner Harbor.

APPROPRIATIONS, ETC. — *Continued.*

LOCALITY.	Character of Work.	Total Appropriation.	Contributions by Municipality or Others.	Total Expenditure.
East Bay, Osterville . . .	Jetties, dredging and removing scows.	\$61,258 79	\$10,000 00	\$70,924 23
Edgartown Harbor . . .	Survey . . .	2,526 62	300 00	2,826 62
Ellisville Harbor . . .	Dredging . . .	16,793 40	—	16,793 40
Essex County beaches . . .	Survey . . .	1,000 00	—	1,000 00
Essex River . . .	Dredging . . .	38,428 33	—	38,428 33 ¹
Fall River Harbor . . .	Improvement . . .	350,290 54	—	1,130 18
Falmouth Heights, Falmouth .	Sea wall . . .	37,566 83	13,000 00	50,566 83
Falmouth Inner Harbor . . .	Dredging, jetties and wall.	94,536 17	14,000 00	108,536 17
Gloucester Harbor, Gloucester	Dredging and removing ledges.	107,637 06	10,800 00	118,437 06
Gloucester, Western Ave., . .	Sea wall, . . .	3,371 00	—	3,371 00
Great ponds . . .	Survey . . .	5,000 00	—	4,915 80
Green Harbor, Marshfield . .	Jetties, dredging and survey.	90,804 54	—	76,466 85
Gun Rock Point, Hull . . .	Breakwater . . .	48,096 11	10,000 00	58,096 11
Harbor Cove, Gloucester . . .	Survey and dredging	18,528 73	866 00	19,394 73
Herring Creek, Scituate . . .	Survey . . .	253 76	—	253 76
Herring River, Harwich . . .	Jetties and dredging .	55,136 46	2,500 00	56,992 16
Herring River, Wellfleet . . .	Dikes and ditches . .	11,832 74	10,000 00	21,800 73
Housatonic River, Sheffield . .	Survey . . .	2,011 29	—	2,011 29
Hull . . .	Sea wall and survey .	25,258 32	8,882 06	34,140 38
Humarock Beach, Scituate . .	Survey . . .	37,639 19	37,816 38	56,960 63
Hyannisport, Barnstable . . .	Survey and breakwater.	62,517 76	2,500 00	65,017 76
Improvement of rivers and harbors.	General expenses . .	17,423 65	—	17,423 65
Ipswich River, Ipswich . . .	Jetty, wall, riprap and dredging.	47,325 48	1,000 00	48,318 92
Kings Beach, Swampscott . . .	Removal of obstruction.	166 41	—	166 41
Lake Anthony, Oak Bluffs . .	Jetties and dredging .	73,740 28	5,000 00	75,531 24
Lake Quannapowitt, Wakefield	Investigation . . .	1,004 21	—	345 32
Lewis Bay, Barnstable . . .	Survey and dredging	29,211 64	—	28,963 21
Little Harbor, Marblehead . .	Dredging . . .	8,666 16	2,500 00	11,166 16
Little River, Gloucester . . .	Survey . . .	862 93	—	862 93
Lobster Cove, Gloucester . . .	Dredging . . .	33,589 16	1,500 00	35,089 16
Lynn Harbor, anchorage basin	Survey and dredging	121,789 29	5,200 00	121,588 07
Lynn Harbor and Saugus River	Dredging and filling .	125,931 53	37,500 00	163,431 53
Manchester Harbor . . .	Survey, jetties and dredging.	68,100 67	43,500 00	109,078 51
Mattapoissett . . .	Survey . . .	255 48	—	255 48
Megansett Harbor . . .	Dredging . . .	39,530 57	12,730 00	52,116 66

¹ \$5,000 expended by the United States government.

APPROPRIATIONS, ETC. — *Continued.*

LOCALITY.	Character of Work.	Total Appropriation.	Contributions by Municipality or Others.	Total Expenditure.
Menamsha Inlet, Chilmark and Gay Head.	Jetties, dredging and sea wall.	\$77,443 15	\$700 00	\$78,039 50
Merrimack River . . .	Investigation and survey.	1,308 50	—	1,208 50
Mill River, Gloucester . .	Survey and dredging	24,632 86	300 00	24,899 59
Mitchells River, Chatham .	Survey . . .	322 96	—	322 96
Nantucket Harbor . . .	Dredging . . .	42,058 63	1,000 00	42,779 78
New Bedford Harbor . . .	Dredging . . .	18,856 57	—	18,856 57
New Bedford Harbor . . .	Pier, shed and dredging.	371,899 77	13,446 74 ¹	385,346 51
New Bedford State Pier . .	Improvement of .	73,461 00	—	73,436 38
New Bedford State Pier . .	Operation and maintenance.	59,274 33	—	49,659 09
Newburyport Harbor . . .	Survey. . . .	115 97	—	115 97
Nobscusset Harbor, Dennis .	Breakwater, dredging and riprap.	46,515 89	1,200 00	38,355 34
North River, Marshfield . .	Surveys and removing rocks.	6,858 75	1,800 00	8,658 75
North River, Salem . . .	Survey	704 52	—	704 52
Oak Bluffs	Removing rocks .	632 45	—	594 95
Oak Bluffs	Sea wall	34,074 25	2,500 00	36,574 25
Onset Bay, Wareham . . .	Survey and dredging	14,295 89	1,000 00	15,295 89
Orleans	Survey	104 18	—	104 18
Pamet River, Truro . . .	Survey, dredging and repairing jetties.	191,259 95	1,200 00	192,459 95
Paskamansett River, Dartmouth.	Dredging and jetty .	5,227 68	—	5,227 68
Penikese Island, Gosnold .	Pile wharf and survey	5,300 00	—	5,192 95
Plum Island River, Newbury and Newburyport.	Survey	983 31	—	983 31
Plymouth Harbor	Dredging	178,413 59	71,794 55	223,705 87 ²
Popponnesett Bay	Dredging	46,252 33	—	46,252 33
Powow River	Dredging channel and riprapping wall.	502 94	—	502 94
Province Lands, Provincetown	Reclamation . .	97,000 00	—	93,303 68
Provincetown Harbor . . .	Survey	1,217 78	—	1,217 78
Quansett Harbor, Orleans .	Survey	195 88	—	194 50
Quicks Hole, Gosnold . . .	Survey	500 00	—	—
Red Brook Harbor, Bourne .	Removing pier . .	275 00	—	275 00
Revere	Stone breakwater .	60,407 09	—	60,397 93
Rock Harbor, Orleans . . .	Dredging	12,108 25	400 00	12,492 71
Rockport Harbor	Dredging and removing rocks.	14,429 32	—	13,749 02
Salem Harbor	Survey	3,050 05	—	1,050 05
Salt Pond River, Eastham .	Survey	210 11	—	210 11
Salters Point, Dartmouth .	Breakwater . . .	13,509 59	1,500 00	15,009 59

¹ Paid by surety company.² \$57,000 expended under direction of the United States government.

APPROPRIATIONS, ETC. — *Concluded.*

LOCALITY.	Character of Work.	Total Appropriation.	Contributions by Municipality or Others.	Total Expenditure.
Sandwich Harbor . . .	Dredging channel, riprap and jetties.	\$80,579 84	-	\$80,579 84
Saugus River, Lynn and Saugus	Survey and dredging	54,195 82	\$2,000 00	55,834 35
Scituate	Shore protection .	83,707 00	42,986 94	132,001 64
Scituate harbor . . .	Dredging . . .	96,676 92	8,300 00	104,976 92
Scorton Harbor, Sandwich	Jetty and dredging .	19,426 39	500 00	17,774 34
Sesuit Harbor, Dennis .	Jetty	28,067 85	1,500 00	24,555 10
Sippican Harbor, Marion	Survey	7 17	-	7 17
Smith's Cove, Gloucester	Survey and dredging	5,163 07	-	5,163 02
South River, Salem . .	Dredging	10,523 65	3,000 00	13,462 66
South Watuppa Pond, Fall River.	Fenders and excavation.	203 42	-	203 42
Stage Harbor, Chatham . .	Dikes and survey .	10,803 01	-	10,803 01
Taunton River	Survey and dredging	19,769 66	12,500 00	28,697 18
Taunton-Brockton waterway .	Investigation . .	5,388 46	-	5,278 18
Taunton River-Boston Harbor Canal.	Survey	10,000 00	-	9,932 75
Taunton River-Massachusetts Bay Canal.	Survey	11,786 71	-	11,786 71
Vineyard Haven Harbor . .	Repairing sea wall .	9,564 51	2,380 50	11,945 01
Vineyard Haven Harbor, Tisbury.	Breakwater and dredging.	45,089 48	1,000 00	45,518 25
Waquoit Bay, Falmouth . .	Breakwater wall and bulkhead.	29,583 79	2,000 00	31,285 40
Wareham River	Survey and dredging	37,567 93	5,000 00	42,567 93
Warrens Cove, Plymouth . .	Sea wall	14,749 74	9,713 98	24,761 99
Watch Hill, Chatham . . .	Survey and riprap .	15,020 47	-	14,968 75
Wellfleet Harbor	Survey and dredging	16,867 22	1,500 00	17,600 29
West Bay, Barnstable and Osterville.	Jetties and dredging .	78,457 73	10,000 00	88,420 36
West Falmouth Harbor, Falmouth.	Dredging	25,655 31	-	24,386 18
West Harwich	Survey	40 25	3,000 00	40 25
Westfield River	Survey and jetties .	6,296 90	-	6,037 29
Wild Harbor, Falmouth . . .	Jetty and dredging .	36,194 58	5,000 00	36,137 71
Winthrop shore	Sea walls and protective work.	17,058 48	3,000 00	20,058 48
Witchmere Harbor, Harwich .	Jetties and dredging .	37,147 70	1,000 00	38,005 00
Woods Hole, Great Harbor, Falmouth.	Dredging	5,468 86	1,500 00	6,968 86
Wrecks	Removal from tide-water.	67,645 65	-	8,834 07
Yarmouthport Harbor . . .	Survey	83,977 37	7,000 00	90,977 37
		\$4,876,724 58	\$547,249 78	\$4,974,443 18

FEDERAL APPROPRIATIONS AND EXPENDITURES.

Federal appropriations and expenditures for improvement of rivers and harbors in Massachusetts from the establishment of the government to the close of the fiscal year ending June 30, 1922, as shown in the following tables, furnished by the Chief of Engineers, U. S. A.:—

TABLE NO. 1. — *Localities at Present under Improvement.*

[Compiled from the annual report of the Chief of Engineers, U. S. A., for the fiscal year ending June 30, 1922.]

LOCALITY.	Expenditures.	Appropriations.
Newburyport Harbor	\$495,900 00	\$495,900 00
Merrimack River	404,401 95	414,466 72 ¹
Sandy Bay, Cape Ann, harbor of refuge	1,941,478 00	1,941,478 00 ²
Gloucester Harbor	538,183 00	538,183 00 ³
Beverly Harbor	49,125 00	110,625 00
Salem Harbor	71,368 66	71,368 66 ⁴
Lynn Harbor	471,099 95	471,637 00 ⁵
Mystic River (upper portion)	305,811 92	336,050 00 ⁶
Mystic River (below mouth of Island End River)		
Malden River	149,950 00	149,950 00
Boston Harbor	12,623,302 63	12,669,827 58 ⁷
Dorchester Bay and Neponset River	95,008 00	95,008 00
Weymouth Fore River	533,557 55	573,750 00
Weymouth Back River	26,500 00	27,000 00
Plymouth Harbor	364,032 75	366,459 80 ⁸
Provincetown Harbor	348,062 72	348,162 97
Pollock Rip Shoals, Nantucket Sound	810,425 17	980,000 00
Nantucket Harbor of Refuge	576,361 88	591,473 50
New Bedford and Fairhaven harbors	769,610 00	769,610 00
Taunton River	203,806 94	210,189 18
Fall River Harbor	408,656 19	412,411 49
Totals	\$21,156,642 31	\$21,573,550 90

¹ Of original amount appropriated, \$900 was carried to the surplus fund of the treasury from previous project.

² Balance (\$3,522) transferred elsewhere under public resolution of May 2, 1922.

³ Deduction on account of \$3,900 carried to the surplus fund of the treasury.

⁴ Of original amount appropriated, \$1,131.34 was carried to the surplus fund of the treasury.

⁵ Deduction on account of \$5,200 carried to the surplus fund of the treasury.

⁶ Now consolidated as one improvement.

⁷ Including Chelsea Creek, \$46,000 transferred by authority of public resolution No. 58, June 10, 1922.

⁸ In addition, \$57,400 was expended from contributed funds.

TABLE NO. 2. — *Localities in which Work is not now in Progress.*

[Compiled from data furnished by the United States Treasury Department and the Chief of Engineers, U. S. A.]

LOCALITY.	Expenditures.	Appropriations.
Bass River	\$20,150 34	\$20,150 41
Buzzards Bay Harbor	2,500 00	2,500 00
Canapitset Channel	5,312 54	9,800 00
Chatham Harbor	12,171 36	13,732 79
Cohasset Harbor	10,000 00	10,000 00
Duxbury Harbor	37,000 00	37,000 00
East Dennis Breakwater	7 57	1,500 00
Edgartown Harbor	25,000 00	25,000 00
Essex River	30,000 00	30,000 00
Hingham Harbor	38,316 58	39,000 00
Hyannis Harbor	221,787 75	221,267 07
Ipswich River	5,617 91	7,500 00
Kingston Harbor	8,940 09	10,000 00
Little Harbor, Woods Hole	18,000 00	18,000 00
Manchester Harbor	23,985 57	24,300 00
Marblehead Harbor	833 42	1,900 00
Marthas Vineyard Harbor	7,000 00	7,000 00
Powow River	50,940 72	51,000 00
Rockport Harbor	91,229 25	91,232 57
Scituate Harbor	104,590 98	104,680 00
Town River	37,577 41	37,577 41
Vineyard Haven Harbor	55,387 35	60,000 00
Wareham Harbor	95,997 30	96,236 00
Wellfleet Harbor	11,365 57	16,000 00
Westport Harbor and River	3,000 00	3,000 00
Winthrop Harbor	9,000 00	9,000 00
Woods Hole Channel	343,599 92	344,000 00
Totals	\$1,269,311 63	\$1,291,376 25

RECAPITULATION.	Expenditures.	Appropriations.
Total of Table No. 1	\$21,186,642 31	\$21,573,550 90
Total of Table No. 2	1,269,311 63	1,291,376 25
Grand totals	\$22,455,953 94	\$22,864,927 15

EXPENDITURES ON BOSTON HARBOR AND ITS TRIBUTARIES TO JUNE 30,
1922.

[The tributaries given are those now under improvement, and do not include tributaries heretofore improved.]

LOCALITY.	Expenditures.	Appropriations.
Boston Harbor proper ¹	\$12,623,302 63	\$12,669,827 58
Mystic River (below mouth of Island End River) ²	} 305,811 92	336,050 00
Mystic River (upper portion) ²		
Malden River	149,891 55	149,950 00
Totals	\$13,079,006 10	\$13,155,827 58

¹ Including Chelsea Creek.² Now one improvement.

CONTRACTS MADE BY THE DEPARTMENT OF PUBLIC WORKS, DIVISION
ENDING

Contract No.	WORK.	Contractor.	Date.
22	North Scituate, sea wall	Arthur J. Mitchell	Sept. 14, 1921
24	East Boston, dredging and filling .	Atlantic, Gulf and Pacific Company.	May 11, 1921
26	Witchmere Harbor, dredging . . . Oak Bluffs, riprap Menamsha, jetty repairs and resetting light. Menamsha, dredging Falmouth Inner Harbor, riprap . . Wild Harbor, Falmouth, dredging channel. Herring River, dredging channel . Hyannisport, dredging Hyannisport, removing boulders . Lake Anthony, dredging West Bay, Barnstable, riprap . . . Herring River, riprap	William E. Burke	May 13, 1921
38	Bullock Street Extension and Cypher Street, paving.	B. E. Grant Company	Aug. 30, 1921
39	East Boston bulkhead	William L. Miller Company .	Sept. 14, 1921
40	Taunton River, dredging	Bay State Dredging and Contracting Company.	Nov. 3, 1921
41	Oak Bluffs sea wall and Witchmere Harbor jetty, riprap protection.	T. A. Scott Company, Inc. .	Nov. 18, 1921
43	Viaduct, stairs from Northern avenue.	George M. Bryne	Jan. 3, 1922
44	Third Cliff, Scituate, riprap . . .	W. H. Connor & Son Company	Feb. 10, 1922
45	New Bedford, dredging opposite State pier.	Bay State Dredging and Contracting Company.	March 14, 1922
46	B Street Extension, paving private way to Northern Avenue.	B. E. Grant Company	May 1, 1922
47	Beach Street, North Scituate, sea wall.	John Williams & Co. . . .	May 1, 1922

OF WATERWAYS AND PUBLIC LANDS, AND IN FORCE DURING THE YEAR
Nov. 30, 1922.

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1922.	Total paid to Nov. 30, 1922.	Estimated Amount of Contract.
Completed May 6, 1922.	For constructing new wall, \$11 per cubic yard of concrete measured in completed work. For constructing concrete footings under existing wall, \$4 for each linear foot of completed footing. For excavating, placing and grading of material, \$1 per cubic yard of material measured in place before excavating.	\$10,686 06	\$16,526 77	\$16,526 77
Completed Oct. 28, 1922.	Dredging areas at East Boston and depositing material, 32.94 cents per cubic yard. Dredging and depositing material brought from other portions of harbor, 22 cents per cubic yard.	410,804 70	632,478 95	-
		746 74	4,942 26	4,942 26
		1,154 33	7,455 56	7,455 56
		1,426 22	1,426 22	1,435 00
		10,819 20	10,819 20	10,819 20
		82 50	550 00	550 00
Completed	Unit prices	971 86	6,442 05	6,975 00
		1,336 89	8,876 61	8,876 61
		2,399 08	9,164 47	9,164 47
		2,250 00	2,250 00	2,250 00
		11,787 25	11,787 25	11,787 25
		3,938 15	6,477 72	6,477 72
		5,168 46	5,168 46	5,168 46
Completed Dec. 31, 1921.	Unit prices	36,086 90	61,055 65	-
Completed Dec. 16, 1921.	\$27.71 for each linear foot of completed bulkhead.	19,898 50	52,649 00	52,649 00
Completed March 8, 1922.	Dredging, 72 cents per cubic yard, scow measurement. Removing boulders, \$22 per cubic yard.	23,342 48	25,854 94	25,854 94
Completed Jan. 19, 1922.	For furnishing and placing stone chips and riprap at Oak Bluffs, \$6.45 per ton.	6,018 49	6,018 49	8,535 00
	For furnishing and placing stone chips at Witchmere Harbor, \$6.95 per ton.	2,193 78	2,193 78	
Completed April 24, 1922.	Lump sum of \$2,736	2,736 00	2,736 00	2,736 00
In progress . . .	Unit prices	1,002 57	1,002 57	60,000 00
Completed April 14, 1922.	Dredging, 34 cents per cubic yard, measured in scows. Removing boulders, \$20 per cubic yard.	16,748 06	16,748 06	16,748 06
Completed Sept. 22, 1922.	Unit prices	33,809 99	33,809 99	33,809 99
Completed Aug. 22, 1922.	For furnishing materials and constructing concrete wall facing and spur jetties, \$10.90 per cubic yard of concrete measured in completed work.	14,600 05	14,600 05	14,600 05

CONTRACTS MADE BY THE DEPARTMENT OF PUBLIC WORKS, DIVISION
ENDING NOV. 30, 1922

Contract No.	WORK.	Contractor.	Date.
48	Sand Hills, Scituate, sea wall .	W. F. Loud & Sons Company .	May 1, 1922
49	Falmouth Inner Harbor, dredging .	William E. Burke . . .	April 26, 1922
50	Savin Hill, Dorchester, dredging .	Bay State Dredging and Contracting Company.	May 8, 1922
51	Megansett Harbor, Falmouth, dredging.	Gerrish Dredging Company .	June 13, 1922
52	East Boston, extension of bulkheads	William L. Miller Company .	May 29, 1922
53	East Boston, airplane landing field and approaches.	Vincent N. Bellizia . . .	Aug. 15, 1922
54	East Boston, steel hangars at aircraft landing field.	Coleman Brothers, Incorporated	Sept. 1, 1922
55	East Boston, Commonwealth railroad.	J. F. Kennedy Company . .	Aug. 7, 1922
56	Mystic River, dredging below Malden bridge.	W. S. Rendle & Son Company .	July 26, 1922
57	Hingham Harbor, dredging . . .	W. S. Rendle & Son Company .	Aug. 14, 1922
58	Commonwealth Pier No. 5, South Boston, trestle at heating plant.	William L. Miller Company .	Aug. 7, 1922
59	Essex River, dredging	Bay State Dredging and Contracting Company.	Aug. 7, 1922
60	Saugus River, dredging	Bay State Dredging and Contracting Company.	Aug. 7, 1922
61	Commonwealth Pier No. 6, South Boston, repaving.	B. E. Grant Company . . .	Aug. 24, 1922
62	Nobscusset Harbor, Dennis, dredging.	William E. Burke	Aug. 25, 1922

OF WATERWAYS AND PUBLIC LANDS, AND IN FORCE DURING THE YEAR
— *Continued.*

Condition of Work.		Contract Prices.	Amount paid during Year ending Nov. 30, 1922.	Total paid to Nov. 30, 1922.	Estimated Amount of Contract.
Completed	July 12, 1922.	For furnishing materials and constructing the main wall and return wall, \$12.25 per cubic yard of concrete measured in completed work. For furnishing materials and constructing each spur jetty, \$100 for each complete jetty 15 feet in length.	\$4,858 34	\$4,858 34	\$4,858 34
Completed	June 9, 1922.	Dredging, 57 cents per cubic yard, scow measurement. Removing boulders, \$15 per cubic yard.	7,794 75	7,794 75	7,794 75
Completed	June 20, 1922.	Dredging, 49 cents per cubic yard, scow measurement. Removing boulders, \$18 per cubic yard. Removing and replacing certain piles, \$350.	13,943 58	13,943 58	13,943 58
Completed	Sept. 11, 1922.	Dredging, 49 cents per cubic yard. Removing boulders, \$12 per cubic yard.	17,640 00	17,640 00	17,640 00
In progress	.	For building single bulkhead, \$28 per linear foot of completed bulkhead. For building double bulkhead, \$28.40 per linear foot of completed bulkhead.	31,159 22	31,159 22	45,200 00
In progress	.	Unit prices	13,079 80	13,079 80	35,744 00
In progress	.	Unit prices	1,315 37	1,315 37	9,040 00
In progress	.	Unit prices	5,973 89	5,973 89	19,597 50
Completed	Oct. 26, 1922.	Dredging, 33 cents per cubic yard, scow measurement. Removing boulders, \$10 per cubic yard.	9,805 44	9,805 44	10,340 00
Completed	Nov. 17, 1922.	Dredging, 32 cents per cubic yard, scow measurement. Removing boulders, \$12 per cubic yard.	19,708 85	19,708 85	22,092 00
Completed	Sept. 11, 1922.	Lump sum of \$2,396	2,396 00	2,396 00	2,396 00
In progress	.	Dredging, 54 cents per cubic yard, scow measurement. Removing boulders, \$18 per cubic yard.	29,089 12	29,089 12	56,340 00
Completed	Oct. 4, 1922.	Dredging, 64 cents per cubic yard, scow measurement. Removing boulders, \$18 per cubic yard.	33,765 50	33,765 50	24,338 00
Completed	Oct. 30, 1922.	Unit prices	19,959 98	19,959 98	29,262 35
Completed	Nov. 4, 1922.	Dredging, 73 cents per cubic yard <i>in situ</i> . Removing boulders, \$16 per cubic yard.	8,066 50	8,066 50	9,000 00

CONTRACTS MADE BY THE DEPARTMENT OF PUBLIC WORKS, DIVISION
ENDING NOV. 30, 1922

Contract No.	WORK.	Contractor.	Date.
63	Gloucester Harbor, rock excavation	George T. Rendle . . .	Sept. 22, 1922
64	Western Avenue, Gloucester, sea wall.	Bay State Dredging and Contracting Company.	Nov. 10, 1922
65	West Harwich, jetty east of Herring River.	George T. Rendle . . .	Nov. 8, 1922
66	New Haven docks, dredging . .	Bay State Dredging and Contracting Company.	Oct. 23, 1922

OF WATERWAYS AND PUBLIC LANDS, AND IN FORCE DURING THE YEAR
— *Concluded.*

Condition of Work.	Contract Prices.	Amount paid during Year ending Nov. 30, 1922.	Total paid to Nov. 30, 1922.	Estimated Amount of Contract.
In progress . .	For removing ledge near Five Pound Island, \$14,993. For removing rocks near Parkhurst's Wharf, \$750. For removing rocks in Harbor Cove near Parmenter-Rice and Atlantic Halibut Company's Wharves, \$750. For removing rock in Harbor Cove near wharf of Gloucester Fresh Fish Company, \$750. For removing three rocks near head of harbor, \$750.	\$4,675 00	\$4,675 00	\$17,993 00
In progress . .	Unit prices	2,890 00	2,890 00	54,630 25
In progress . .	For furnishing and placing stone riprap and chips in jetty and as bank protection, \$5.19.	-	-	11,000 00
In progress . .	Dredging, 39.9 cents per cubic yard. Removing boulders, \$16 per cubic yard.	17,349 89	17,349 89	33,900 00

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